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ABSTRACT

This volume presents 12 papers offering guidelines to higher education institutions on planning for the deregulation of the electric power industry. Following an introduction (by Dorsey D. Jacobs), the papers are organized into three parts which address: the changing market, identifying opportunities and challenges, and taking advantage of electric deregulation. The included papers are: (1) "Electric Utilities: An Overview of the Industry" (Sheree L. Brown); (2) "Stranded Costs" (Sheree L. Brown); (3) "Legal/Regulatory Background and Status Report" (Steven R. Hunsicker); (4) "Statewide Policy Issues--Being a Player" (Sheree L. Brown); (5) "How To Lower Your Costs with the Local Electric Provider" (Dan Desmond); (6) "Taking Advantage of Deregulation" (D. Michael Cornwell); (7) "The Challenge of Energy Conservation and Clean Power in a Deregulated Electric Market" (Walter Simpson); (8) "Cogeneration and Self-Generation" (Lyle D. Wachtel); (9) "Team Formation" (Sheree L. Brown, David E. Crawford, Peter H. Grills, and James J. Sebesta); (10) "Internal Improvement: How To Become a More Attractive Customer" (B.N. Tripathi); (11) "How To Maintain Energy Conservation Initiatives and Buy Clean Power: Strategies for Campus Energy Users" (Walter Simpson); and (12) "Procurement of Energy Services" (Gary C. Matteson). Appendices include a summary of services provided by the Association of Higher Education Facilities Officers and a list of relevant Web sites. (Contains approximately 75 references.) (DB)

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A Facility Manager's Guide

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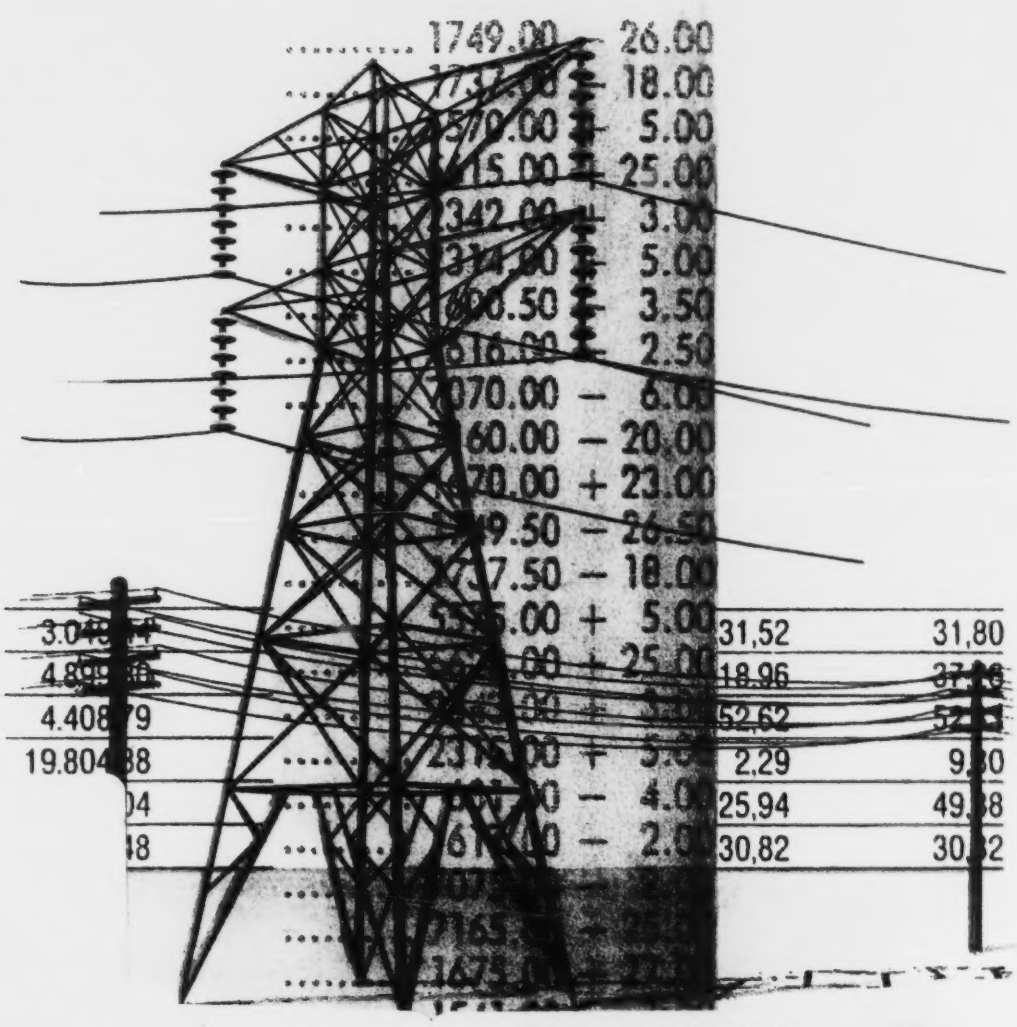

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Electric Restructuring and Utilities Deregulation

A Facility Manager's Guide

Electric Restructuring and Utilities Deregulation

A Facility Manager's Guide

APPA: The Association of Higher Education Facilities Officers

Alexandria, Virginia

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APPA first wishes to thank President Pete van der Have of the University of Utah for his foresight and leadership in addressing the issue of electric restructuring and utilities deregulation. His creation of the APPA Energy and Utilities Task Force immediately led to the development of this publication, which appears only six months after the task force's first meeting in Alexandria, Virginia. The material and perspectives found herein suggest only a tip of the information, strategies, and opinions that will be generated over the next few years as the impacts of deregulation begin to be felt, understood, anticipated, and responded to.

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Introduction

Dorsey D. Jacobs

The electric power industry is in the midst of becoming a deregulated industry. This will "pull the plug" on local electric monopolies and open them up to competition.

Competition in electricity will be produced through open access. When retail electricity is deregulated and competition gets into full swing, consumers will be able to buy electricity and electric services from different suppliers by using the same electric lines they currently use. With deregulation comes a period of confusion, but also a period of great opportunity.

Educational institutions, both K–12 and higher education, should embark immediately on developing a strategic long-range plan. Currently K–12 and higher education institutions are spending more than $12 billion per year on energy and purchased utilities. The expected benefit in reduced costs for electric power could be as much as 10 to 20 percent, especially for customers who are currently paying higher than average rates. Customers with large loads or the ability to aggregate loads—colleges, universities, and

school districts—are desirable customers for electric utilities and fit into this category.

APPA: The Association of Higher Education Facilities Officers recognizes the opportunity for savings with deregulation but also realizes the confusion that exists inasmuch as each state regulates its own power industry.

In January 1998, APPA President Pieter J. van der Have of the University of Utah invited several prestigious experts to serve on an Energy and Utilities Task Force. The purpose of the task force was to explore electric/utilities restructuring and its impact on education institutions. The result of their work is this publication, which also includes a process for developing a new energy contract, a bibliography for further reading and research, and a list of websites to help keep your information current.

I would like to thank the following members of the task force for the energy and expertise they brought to the work at hand. Their contributions were tremendous in developing, structuring, writing, and reviewing this book.

- Dorsey D. Jacobs, APPA Past President, *Chairperson*
- Sheree L. Brown, SVBK Consulting Group
- D. Michael Cornwell, Evantage, a Division of Virginia Power
- Steven R. Hunsicker, Baker and Botts
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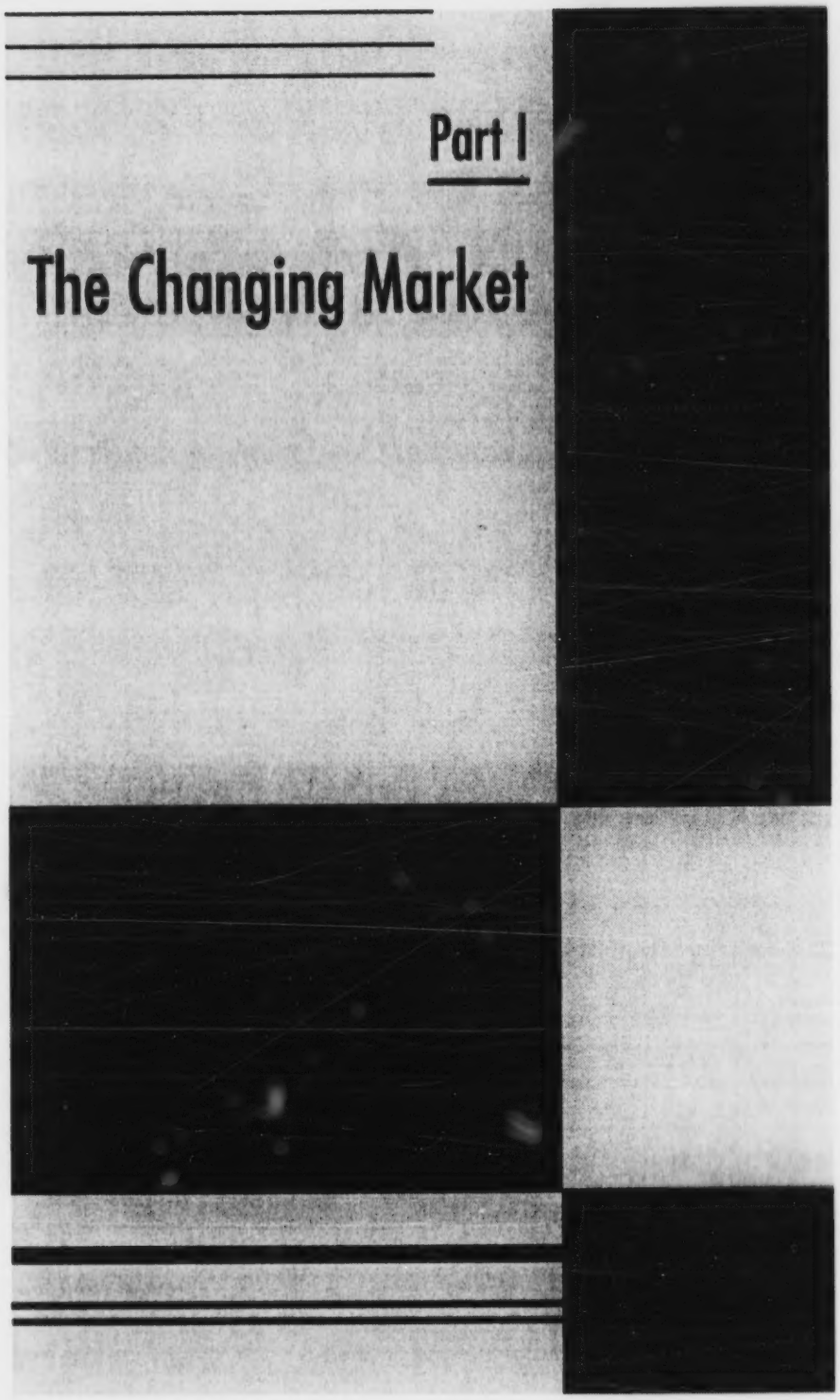
- B.N. (Trip) Tripathi, CES/Way International, Inc.
- Lyle D. Wachtel, University of Illinois/Urbana-Champaign

We recognize that this book can only offer a brief introduction to the myriad issues that deregulation will bring, but it is our hope that we have provided some valuable food for thought as you plan and negotiate your institution's future energy direction.



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Chapter 1

Electric Utilities: An Overview of the Industry

Sheree L. Brown

The electric utility industry is going through a period of rapid change, moving from the traditional monopolistic environment to a more competitive environment. This change is causing confusion and concern for utilities and consumers alike. The transition to a competitive electric utility industry will have a profound effect on the way that educational institutions procure energy services and may potentially result in significant changes in the costs of operating institutional facilities.

Competition in the electric industry is unlike competition for most consumer goods. The cost to produce electricity varies among consumers, making some sales much more attractive to suppliers than others. Thus, competition in the electric utility industry is a "two-way street," with suppliers competing for customers and customers competing for the lowest cost suppliers. To achieve the greatest level of benefits from restructuring of the electric industry,

large consumers of electricity, such as educational institutions, must understand the industry and position themselves to identify and take advantage of opportunities in the competitive environment.

Traditional Electric Power Supply and the Movement to Competition

As with other industries, the electric industry consists of a production system and a delivery system. Energy is produced, or generated, at the production plant and delivered at high voltages to the transmission system. The voltage is then reduced at a transmission substation to a usable voltage and delivered to the ultimate consumer over the distribution system (Figure 1-1).

When compared with other industries, the electric industry is very complex. The resources required to produce electricity often have long lead times and significant envi-

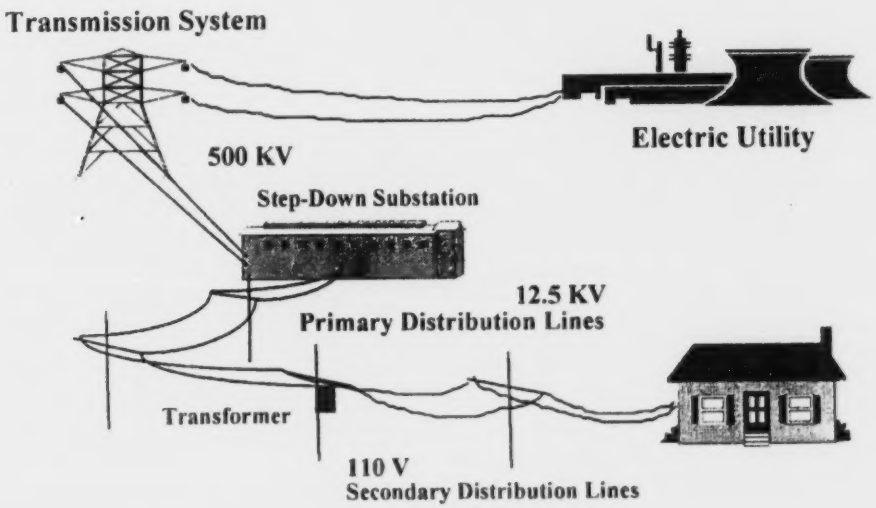

Figure 1-1. *Diagram of traditional electric power supply.*

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ronmental impact. Fuel choice is critical to the economic viability of the chosen resources—and, as evident in the past, fuel prices can be very volatile and uncertain. In addition, the delivery system for electricity is much more complex than that for most other industries. To ensure that customer demand is met, the system must accommodate information needs and address potential constraints in delivering power. Unlike in the theoretical production of "widgets," the system must be highly accurate and reliable because of the critical nature of the commodity to both the health and welfare of the nation's citizens and to the nation's economy.

As a result of the intense capitalization historically required to develop production facilities and the inefficiency of duplicating the delivery system, the nation's electric systems evolved as monopolistic entities within each service territory. Over the past century, regulation of electric utilities was implemented to ensure that the nation's electric systems were safe, reliable, and sufficient to serve the needs of consumers, while attempting to simulate competition to protect consumers from the unfair pricing that could result from a monopolistic environment. In this regulatory environment, the nation's electric systems for the most part have provided safe, reliable, and sufficient service. However, many believe that regulatory rate-making practices have failed to simulate competition, resulting in higher than necessary prices, inequities among consumer groups, and disparity from one utility to another. In addition, technological advances have made it possible to produce electricity at prices lower than that for many existing capital-intensive plants.

For example, in the United States, there is substantial variation from state to state in the average revenue received by utilities for each kilowatt-hour of electricity sold to retail customers. These differences in the retail price of elec-

tricity have served as motivation for many to support the restructuring of the electric utility industry. Large industrial customers have been very active advocates of the move to deregulation, contending that the substantial variations in the price of electricity from region to region, and even within a region, result in unfair competitive advantages.

Previously isolated electric systems have become interconnected through a nationwide transmission grid. This transmission grid allows economic dispatch of generating units among several electric systems, resulting in fuel cost savings and increased system reliability. Although the interconnection of delivery systems provides the ability to take advantage of diverse resources, it requires a complex system of communication to ensure system reliability. In addition, transmission systems have been developed and controlled by utilities in assigned service territories. The cost savings achieved through this advanced delivery system have typically been realized by transmission-owning utilities, with savings passed on to consumers through regulated rates. The development of the transmission grid, however, provided the opportunity for alternative power suppliers to deliver power to previously captive customers in assigned service territories, thereby eliminating the monopolistic nature of the electric generation business. However, full and fair competition cannot be achieved without requiring nondiscriminatory access to the transmission (delivery) system.

The move toward competition is increasingly being driven by technological factors that create competitive pressures on the regulatory structure. Over the past several years, significant technical improvements in combined-cycle gas turbines now make it possible for generating utilities to take advantage of the relatively low cost of natural gas. Efficiencies also have greatly increased to allow greater output of electricity for each unit of fuel.

These technological advances have changed the structure of the industry such that it is no longer necessary to construct large generating plants to achieve operational economies. Generating plants utilizing the new technologies can be constructed, operated, and maintained more economically than many existing electric generation facilities can be operated and maintained. As a result, in some cases it may be cheaper for utilities or nonutilities to build new capacity using the combined-cycle gas turbine technologies than to operate existing fossil fuel or nuclear generating units.

Consumers are now questioning why they must continue to pay for inefficient, uneconomical generating facilities when there are more economical alternatives. In a purely competitive market, uneconomical producers would be replaced by economical producers.

In the past two decades, the transportation, natural gas, and telecommunications industries have completed a transition from government regulation to market-driven competition. Although there may be considerable debate on the benefits achieved through deregulation of these industries, the process has created pressure for change in the electric industry as well. Successful deregulation of these other industries—combined with dissatisfaction with the ability of electric regulation to effectively simulate competition, technological advances, and price disparities in the electric industry—has initiated and sustained a movement to change the regulatory environment.

Implementation of customer choice for wholesale purchasers of electricity has become a possibility owing to the enactment of the Energy Policy Act of 1992 and the Transmission Open Access Rules of the Federal Energy Regulatory Commission (FERC), requiring nondiscriminatory access to the nation's electric delivery system.

Although the Energy Policy Act and the Transmission Open Access Rules of the Federal Energy Regulatory Com-

mission have gone a long way toward establishing a competitive environment for wholesale purchasers of electricity, the imposition of stranded costs has the ability to delay or prevent true competition. The issue of stranded cost recovery is very complex and is discussed in more detail in Chapter 2.

Many states are currently considering implementation of competition in the electric utility industry for retail, or end-use, customers. The universal hope is that customer choice will lead to reduced electric prices and more service options, resulting in economic efficiencies in the electric industry and growth in the general economy. Several states are either in the process of moving to customer choice or studying the pros and cons of customer choice. Many states have implemented pilot programs to study the problems that may arise through customer choice. A few states have already enacted legislation requiring customer choice in 1998.

Goals of Retail Competition

As regulators and legislators contemplate implementation of customer choice at the retail level, the first step is generally to determine the goals of retail competition. The most common goal is to reduce electric prices. However, although this is an extremely important goal, it is also critical for a restructured environment to maintain or improve system reliability and safety. Service levels should be enhanced, allowing expanded customer choice of services. For example, consumers may have different expectations regarding energy efficiency measures, environmental concerns, real-time pricing, and reliability of service. Another goal is to continue to ensure that public purpose efforts are met. This may include the assurance that funds are sufficient to

meet the requirements for decommissioning nuclear plants or environmental requirements. It may also include social programs to ensure that affordable electricity is available to all consumers, including those with low incomes. The restructured environment should also encourage the continuing development of a competitive market for generation. Competition should not result in the unwillingness of suppliers to meet the future capacity needs of the nation's consumers. Finally, a competitive environment should encourage efficient use of resources (including capital). This goal is critical, because it forms the basis for meeting many of the other goals of competition.

Transitional Goals

Under true competition, prices would not be affected by government subsidies, and all suppliers would be at risk for recovery of their investments in generating resources. Utilities, however, claim that investment in existing uneconomical generation was made in a different regulatory environment in which they were obligated to provide service, and, as a result, they should not be left to shoulder the burden of these assets that have become uneconomic. Many consumers disagree with utilities, arguing that the utilities had an obligation to serve at lowest cost, and in a competitive environment, the burden of uneconomic assets would be borne by the producer. Legislators and regulators are thus attempting to balance the interests of consumers and suppliers.

Debate over matters such as stranded costs, low-income consumer assistance, environmental issues, and other public policy and societal concerns will continue to impede progress toward true competition. Therefore, there must be a period of transition to true competition. In determin-

ing how to effect this transition, goals should be established to ensure that the competing interests of consumers and suppliers are fairly met. It is critical that, even during transition, system reliability and safety are maintained or improved. There should be assurances that all customers will receive equitable benefits from the move to competition and that no particular group will be responsible for unduly subsidizing the benefits of another group.

To foster competition, the restructured environment should create a "level playing field" for all suppliers, both existing and new. In other words, there are three basic "players" in this game of competition: consumers, existing suppliers, and new suppliers. The goal to be met in transition to competition should be to balance the interests of each of these players. Finally, it is important to ensure that the transition is in the public interest and that public policy issues are addressed.

Problems and Solutions

There are four basic areas of concern in restructuring the electric utility industry to effect competition at the retail level: market structure, market power, public policy issues, and stranded cost recovery. The following discussion provides an overview of many problems and issues that are being addressed by policy makers in the development of comprehensive restructuring plans.

Market Structure

Poolco Versus Bilateral Contract Model

Market structure is crucial to ensuring that system reliability and safety are maintained or improved; it is also important in ensuring a level playing field for all suppliers. Mar-

ket structure may be developed using the *poolco* concept. Under a poolco, competitive suppliers bid energy into a pool. Generation is dispatched from the lowest cost to the highest cost. In any particular hour, the clearing price for all energy is the price established by the highest priced energy required to meet consumer demand. Under a pure poolco model, buyers and sellers that want to establish firm prices enter into "contracts for differences," or CFDs. Under a CFD, a buyer pays a supplier when the market clearing price is less than the contract price, and the supplier pays the buyer when the market clearing price is greater than the contract price. For example, if a buyer enters into a CFD with a firm energy price of 2.8¢ per kilowatt-hour, the buyer would pay the seller whenever the market price is below 2.8¢ and the seller would pay the buyer whenever the market price is above 2.8¢.

One of the advantages of the poolco arrangement is that all customers benefit from competition, not just large consumers. However, there are several disadvantages as well. Short-run marginal cost pricing may discourage new suppliers if bid prices are not sufficient to cover the total costs associated with new capacity. There are also concerns that suppliers will drive up market clearing prices by using knowledge of the supply curve rather than their own marginal costs to bid closer to the next highest supplier's marginal costs. The result is that the supplier increases its profit on all of its units that are operating at that time. Smaller suppliers may have difficulty competing under the pure poolco model, even though their supply resource may be particularly attractive to certain consumers.

Another market structure is the *bilateral contract model.* Most institutions choose this structure. Under this model, a consumer can enter into a contract for power with a particular supplier. The disadvantage to the bilateral contract model is that small consumers may not have sufficient buy-

ing power to achieve equitable benefits. Likewise, the small consumer may not have sufficient knowledge or desire to evaluate alternative supply arrangements. The advantage is that particularly attractive customers may be able to negotiate a better deal for their facility.

The *hybrid model* includes both the poolco and the bilateral contract models. The hybrid model simply allows the consumer to either enter into a bilateral contract or take power from the pool. This model solves the problems inherent in the pure poolco and bilateral contract models by allowing smaller suppliers to compete more effectively while protecting smaller consumers. The hybrid model also allows for contracts that could meet specific interests, such as "environmentally correct," or "green," power.

Independent System Operator/Power Exchange

Under any of the power generation market structures, system reliability is maintained by an independent system operator (ISO). Although the total responsibilities of the ISO have not yet been "set in stone," it is generally agreed among industry experts that an ISO acts as the transmission grid operator, with its primary responsibilities being to control the transmission system and coordinate the dispatch of generation in a safe and reliable manner. The ISO is the entity responsible for arranging the delivery of all energy supplied over participating owners' transmission systems. Under most proposals, the ISO also has responsibilities such as coordinating scheduling for all transmission users, managing transmission constraints, obtaining ancillary services on a competitive basis, and balancing the energy transactions on the system. Balancing is particularly important because most retail meters may not have the capability of providing real-time demand data to suppliers.

Because of the ISO's responsibilities to dispatch the system and to follow load, there is a potential for the ISO to bias the transactions of suppliers. To prevent such bias in the market, the ISO—as its name suggests—must remain independent. In developing the competitive market structure, care should be taken to ensure that the ISO has no financial interest in either suppliers or large consumers. The ISO governing board should include representatives from each area, including generation suppliers, transmission owners, and consumers. The ISO should operate in accordance with FERC open access tariffs and the guidelines and operating procedures of the North American Electric Reliability Council and any regional transmission group or reliability council. Although the ISO has the responsibility to assist in transmission system planning, it should have no construction or investment responsibilities.

If a power exchange is developed separate of the ISO, such power exchanges should also remain independent of suppliers and large consumers. Any market structure that uses an ISO/power exchange must have operational procedures in place to ensure an efficient exchange of information between the two entities.

Transmission and Ancillary Services

Open access to transmission facilities has been a critical concern in ensuring that a competitive market can evolve on a nondiscriminatory basis. FERC order 888 provides the rules for transmission access and pricing in wholesale transactions. However, there are jurisdictional concerns regarding the use of transmission facilities for the purpose of providing retail wheeling. FERC has expressed the opinion that it is responsible for retail wheeling transactions using unbundled rates. State commissions undoubtedly will question this authority, as well as the feasibility of applying FERC rules to retail

transactions. By reviewing FERC order 888, it is easy to determine that many of the rules and pricing methods for transmission services at the wholesale level are not applicable to services provided at the retail level. One example is that transmission services are priced on a coincident peak basis at the wholesale level, whereas most retail meters do not have the capability of determining a customer's load at the time of the system coincident peak. Although the FERC claims jurisdiction over transmission services, it has recognized the need to work closely with state regulatory agencies to resolve transmission issues.

Many areas are looking to form region-wide transmission rates. Such a rate structure would assist in the development of a competitive generation market by limiting a barrier to entry by suppliers that may have to deliver power over multiple transmission systems. However, there are still numerous issues to be resolved in the development of region-wide transmission rates. Because all utilities within a particular region do not have uniform investment in transmission facilities, there must be a method of sharing transmission revenue that will fairly compensate all utilities for their investment. Likewise, the location of generation resources may result in transmission constraints in certain areas, resulting in the need for additional transmission capacity or redispatch of generating resources.

Ancillary services are addressed in FERC order 888. These include services required to balance the system and ensure continued reliability of service. In developing a restructuring plan, the responsibility for obtaining ancillary services may be viewed as a responsibility of the ISO. However, there may be a competitive market for such services, and the market structure should allow for competitive bidding of these services. As with the hybrid generation model, ancillary services may be bid through the ISO or directly contracted.

Distribution, Metering, Billing, and Customer Services

Distribution services will remain a regulated monopoly service. However, the competitive generation market will create the need for unbundling of rates to separate the distribution function from the customer service, transmission, and generation functions. There are many constituencies that advocate not only the functional unbundling of rates, but also the actual unbundling of vertically integrated companies through forced divestiture or "spin-off."

There are several concerns with the provision of metering, billing, and customer services after restructuring. Initially these functions may best be provided by the distribution companies. Alternative suppliers may choose to perform some of these functions or to contract with distribution companies, which could be responsible for metering and the timely transfer of metering information to suppliers or for actually providing metering and billing services.

Suppliers are also concerned with the unpaid debts created when consumers use the ability to switch suppliers as a means of avoiding payment. Potential solutions include requiring larger deposits or making billing arrangements with the local distribution company such that control over service changeovers can be exercised.

Market Power

Market power is the ability of a seller or group of sellers to influence price. If a particular seller or group of sellers has sufficient market power, competition will be impeded, and the objective of creating a level playing field cannot be met. When a single supplier controls successive stages of production, that supplier is said to have *vertical market power.* As competition emerges, a utility may provide generation under both regulated and competitive markets. This type of vertical market power may allow the utility to subsidize

its competitive market pricing, thereby gaining an unfair competitive advantage. Vertical market power is also present when a utility controls both generation and delivery functions.

Horizontal market power results when there is a high concentration of generation assets within the relevant market. Owing to the relatively long lead time for new capacity, an initial concentration of generation assets can be expected to reside with the incumbent utilities in any particular market. The development of large utility holding companies that share common facilities through joint dispatch arrangements creates particular concerns with horizontal market power because of affiliated transactions.

One way to eliminate both vertical and horizontal market power is to require divestiture of the incumbent utilities' generation assets. Abuses of vertical market power resulting from ownership of both generation and delivery functions may be eliminated through divestiture or by continued regulation of the transmission and distribution functions. Affiliated transactions must be restricted in the restructured generation market. Transactions between affiliates should be performed at arm's length, and transfers between affiliates should be restricted to prevent potential pricing abuses.

Public Policy Issues

Because of the critical nature of the commodity of electricity to the nation's economy, health, and welfare and the environmental and political issues associated with consumption of energy resources in the production of electricity, numerous public policies have been implemented during the period of regulation. The fate of these public policies, as well as the costs incurred by utilities to comply with such policies, must be addressed in the transition to a competitive electric market.

Obligation to Serve and Default Service

Many policies under regulation deal with ensuring that consumers are provided with safe, reliable electric service. In the transition to competition, there is an additional goal of ensuring that there will be equitable benefits to all consumers. A restructuring plan must first address the obligation to serve consumers. Under traditional regulation, the local utility had an obligation to serve all consumers in its service territory. Under competition, no consumers should be "left out in the cold"; therefore, the obligation to serve must continue. However, the obligation of the distribution company may be revised to require the distribution company to connect the customer (but not to provide the customer's energy requirements). There should also be a plan for supplying "default service," which would provide for customers that, for whatever reason, do not choose an electric supplier. Default service should be structured in a way that will allow these customers to receive advantages from the competitive market.

One approach for providing default service is to allow the distribution company to contract for power to serve the default service customers on its system. This approach, however, violates several of the other goals of competition. For example, in a competitive environment, the generation and distribution functions should remain separate. If the distribution company is allowed to arrange for generation services, there is the potential for biased affiliated transactions if strict guidelines and audit procedures are not in place. All suppliers should have an equal market opportunity to provide default service through competitive bidding. This could be accomplished through the poolco model or the ISO/power exchange. The use of the spot market or poolco model would allow small consumers to receive the market advantages associated with competitive bidding, although these consumers may still be at risk for real-time

pricing. Because the price of electricity would vary hourly, the consumer would be at risk for paying high prices during peak periods unless the consumer took actions to control load during such periods.

Aggregation

A major concern of both advocates and opponents of the movement to competition is that the largest commercial and industrial customers will reap the lion's share of whatever economic benefits come from competition at the expense of smaller commercial and residential customers. Recognizing this potential, regulators have generally adopted the concept of aggregation to allow smaller customers to combine their loads for joint procurement of power and other energy services. Through aggregation, smaller consumers can achieve the market power needed to negotiate better prices or other valuable consideration from prospective suppliers.

Aggregation is already a viable concept, with numerous programs throughout the country currently in place. The city of Manchester, New Hampshire, has successfully developed an aggregation program to serve its citizens and businesses that were chosen to participate in New Hampshire's Retail Competition Pilot Program. As a result of the city's pilot aggregation program, its participants enjoyed the lowest rates of any pilot program participants in the state. The Chicago Housing Authority also recently negotiated a contract for power supply under a program aggregating public housing loads. This program is the type that will allow the benefits of competition to be achieved by all consumers. The rights of consumers and aggregators should be addressed in the development of a restructuring plan.

The examples of aggregation that have already been publicized illustrate that the concept can truly take many forms. In California, public schools have aggregated their

loads. Major national retail chains have negotiated with utilities to serve stores throughout the country, with the express condition that initial service to each store will depend on the date when retail wheeling is available in that particular state. As another example, a group of churches decided to aggregate their loads for the purpose of negotiating better power deals. It is also possible for homeowners associations, social clubs, or any group that includes electricity consumers to aggregate their loads to improve their bargaining position. It has even been suggested that cities could act as an aggregator by default. This would allow the default aggregator to ensure that all customers receive the benefits of competition.

Municipalities across the country are preparing for deregulation by establishing broad-based aggregation programs. Manchester, New Hampshire, is currently building on its pilot program success by developing the Manchester Area Aggregation Program, an intermunicipal aggregation program. The program is available to all New Hampshire municipalities and any of their residents and businesses that choose to join the program. The New Hampshire Municipal Association is also developing a pooled energy program to serve municipalities. The Rhode Island League of Cities and Towns is in the process of developing an aggregation program, as is the Rhode Island Association of School Committees. The Municipal Association of South Carolina is also looking into the benefits of establishing an aggregation program in anticipation of deregulation. The National League of Cities recently held a meeting for its members to address the benefits of aggregation. It is anticipated that municipal aggregation programs will become more widespread as retail wheeling becomes available.

To colleges, universities, and school systems, aggregation of electric loads represents an opportunity to realize the maximum benefits available in a restructured power

market. Recent activity illustrates that, in the deregulated electric market, suppliers will compete for customers, and customers will also compete for suppliers. By making themselves more attractive customers through the development of strategic load aggregation programs, institutional consumers should find themselves in an advantageous position to enter this competitive market.

Although one benefit of aggregation is to combine diverse loads to develop a larger customer base with a more attractive load profile, the ability to select such diverse loads may be limited. However, aggregation may be attractive to potential suppliers for the sheer volume of customers gained and the associated market recognition. Larger consumers with more attractive load profiles may be concerned that joining an aggregation program would result in a loss of potential competitive benefits as they may subsidize other aggregation participants with less attractive load profiles. This loss can be prevented by allowing the supplier to bid separate rate structures based on load characteristics. Universities and colleges with multiple end-use consumers should view aggregation as an opportunity to reduce *overall* campus energy costs and may need to rethink traditional ways of budgeting to ensure that segmenting departments does not result in a net increase in energy costs or lost opportunities for the greatest decrease in overall energy costs.

Low-Income Assistance/Critical Use Protection

Many programs currently exist to provide assistance to low-income consumers. The fate of these programs should be determined when developing any plan to allow retail competition. Suggested alternatives include funding low-income assistance programs through distribution charges or state budget appropriations. Termination provisions must also

ensure critical use protection such as essential winter heating requirements.

Conservation and Load Management

Prior to the movement to competition, utilities planned for their resource needs using an approach called *integrated resource planning*. Under integrated resource planning, a utility develops a plan to meet its projected load requirements through a combination of supply-side resources, such as generators and purchased power contracts, and demand-side resources, such as interruptible rates and load management programs. In addition, conservation and energy efficiency programs have been implemented to reduce load. Under competition, a movement away from demand-side management programs is expected as suppliers look to increase sales. Because conservation and load management programs have long been of interest and concern to institutional consumers of power, these consumers should be involved in the development of policies that will determine responsibility for carrying out the programs and a fair and equitable way to pay for the programs. In addition, the treatment of reduced sales as a result of such programs should be determined in a manner that will be fair and equitable to existing suppliers as well as new competing suppliers. However, conservation and load management programs may become an optional service provided to interested consumers in the competitive market.

Environmental Issues and Qualifying Facilities

Environmental issues must also be addressed in restructuring. Suppliers will undoubtedly be held responsible for meeting appropriate environmental standards, and the costs of compliance will be built into market prices. However, under the Clean Air Act of 1990, there are different levels

of environmental standards applied to old and new resources. This may result in the use of resources having less stringent performance standards, thereby defeating the purpose of such standards and providing unfair market advantages to certain suppliers. Environmental issues may also include public policy mandates to develop renewable energy resources. Again, continued mandates for renewable energy resources should address any inequities that such mandates may create between competitive suppliers. Although some consumers may choose to purchase "green" energy on the competitive market, the magnitude of supply relative to such demand is not yet known.

As with mandates for renewable energy resources, many utilities are currently faced with contracts for purchasing capacity and energy from small power producers/qualifying facilities under the provisions of the Public Utilities Regulatory Policies Act of 1978. These contracts were originally developed based on a utility's "avoided costs." Technological advances and changes in the economic environment have caused many such contracts to be much higher priced than a utility's current avoided costs. In addition, the implementation of competition may make such contracts even less economical. During restructuring, the contractual requirements associated with qualifying facilities create a significant dilemma. Although many of these contracts are legally binding and may not have "escape clauses," the continued requirement to purchase uneconomical capacity and energy from qualifying facilities has been the topic of considerable debate. The incumbent utilities are arguing that these contracts, based on avoided cost, will result in qualifying facilities having an unfair advantage in a competitive market and will unduly penalize the utilities. Because many institutions are owners of qualifying facilities, it is important that they become involved in the regu-

latory process that will determine how these contracts will be treated in a restructured market.

Decommissioning

Planning for nuclear decommissioning has become a critical problem for nuclear utilities in the United States. It is obviously in the public interest to ensure that nuclear facilities are safely and effectively shut down and decommissioned. The costs of decommissioning, however, are expected to be astronomical. Because the high costs of decommissioning may not be recoverable through competitive market pricing, the recovery of such costs must be addressed when developing a plan for restructuring. Although decommissioning costs may be included in stranded cost recovery, the potential time limitations for such recovery may require that decommissioning be considered a separate public policy issue.

Tax Issues

Public policy issues also include the change in tax revenues that may occur as a result of a change in electric industry structure. As with most public policy issues, there may be significant differences in needs and requirements from state to state and region to region. The potential impact of restructuring on tax revenues can be demonstrated by an example that occurred after restructuring of the natural gas industry. The city of St. Paul, Minnesota, collected gross receipts tax revenue on gas sales within the city limits. After restructuring, consumers in St. Paul purchased their gas outside the city limits, and the local gas utility became a local distributor only. As a result, the city lost a significant portion of its budgeted gross receipts tax revenue on gas sales. This result was not only critical to the

city's budget, but it also violated the level-playing-field principle, because gas sales from a local utility would carry an additional cost to consumers that would not be present when purchasing from an outside supplier.

Marketing

Because of the complexities of the electric utility industry, customer education is important if all consumers are to receive benefits from competition. Bills should be designed and presented in a way that will allow consumers to understand the breakdown of services and enable them to compare competitive alternatives.

Full and fair competition must also be accompanied by fair marketing practices. "Slamming" is a term used for "tricking" a customer into signing up for service. This is generally done by providing the customer with a check that, when endorsed, is also a binding contract for service. Another practice that should be addressed is that of "redlining." Redlining is where a supplier chooses not to serve a particular area based on demographics. These and other marketing practices should be monitored to ensure full and fair competition.

There may be many other public policy issues that are particular to a certain region or state. It is most important to understand that, as the market moves toward competition, public policy issues must be identified and re-examined to develop a fair and equitable resolution of the issues for all constituencies.

From Regulation to Competition

The nation is steadily moving from a regulated utility environment to a competitive utility environment. The short-

term result will be complex rulemaking as policy makers struggle to develop appropriate guidelines for restructuring. Although many states are taking a "wait-and-see" approach, these states may find that policies developed by others do not effectively address the issues applicable to their local utility situations. States should be prepared for deregulation on a state level and may want to actively participate in the development of federal legislation that may affect consumers and suppliers in the very near future.

Chapter 2

Stranded Costs

Sheree L. Brown

The issue of stranded cost recovery is by far the most complicated and controversial issue to be addressed in the restructuring debate. Under many proposals for stranded cost recovery, consumers would pay the same price for power in a competitive environment that they were previously paying under regulation throughout the stranded cost recovery period. Stranded cost recovery thus has the potential to destroy or significantly delay the benefits to be derived from competition.

Definition of Stranded Costs

Stranded costs have been defined in many ways:

- Under the Federal Energy Regulatory Commission (FERC) open access rules, stranded costs are determined based on lost revenues (i.e., comparing current rates to estimates of achievable market prices).

- Some would like to have stranded costs limited to previously approved costs that have been deferred for future recovery or to costs that were mandated by state or federal legislation or policies.
- Stranded costs have also been defined as prudent, verifiable investments, commitments, or expenses not yet recovered and unlikely to be recovered in a competitive power market.
- In its recent restructuring proceedings, the New Hampshire Public Utilities Commission defined stranded costs as net sunk generation costs that ordinarily would not be recovered if retail consumers are allowed access to alternative generation resources.
- Stranded costs have been broadly defined by the U.S. Department of Energy as "costs that have been prudently incurred by utilities to serve their customers but cannot be recovered if the consumers choose other electricity suppliers."

There is no consensus on defining and measuring stranded costs, and even if a consensus were reached, application to a particular utility's costs would remain controversial. However, even more controversial is the issue of stranded cost recovery. Should utilities be allowed to recover 100 percent of their stranded costs, should there be a sharing of these costs between the utilities and the consumers, or should the utilities be responsible for 100 percent of stranded costs?

Considerations for Stranded Cost Recovery

Many utilities are making the claim that anything less than 100 percent recovery of their stranded costs would violate the "regulatory compact" between the utilities and the state and federal governments. The essence of the regulatory

compact argument is that utilities had an obligation to provide safe, reliable electric service to all consumers, and, in return, utilities were provided with a protected service area and the ability to earn a fair rate of return on their investments for their stockholders. The utilities argue that this regulatory compact thus provides a claim of entitlement to full reimbursement of a utility's investment, including a reasonable level of profit. Opponents argue that no one has yet been able to produce a copy of the so-called regulatory compact and that no such contract exists.

Utilities further claim that shareholders had certain expectations that their costs would be recovered under regulation and that the interests of these shareholders should be protected by allowing 100 percent stranded costs recovery. However, shareholders in many industries have earnings expectations that are not met. Earnings in many industries are affected by unforeseen changes in governmental policies, yet shareholders are not protected through government subsidies. Investors typically bear the risk of recovery of their investments and any profit on those investments.

Another claim is that utilities, while under regulation, did not have the opportunity to earn higher profits and should be protected against lower profits that may be realized under a competitive environment. This argument assumes that utilities did not have any risks associated with their investments; yet if utilities were risk free, then the historical authorized returns would have been closer to the rate on U.S. Treasury bonds.

Another consideration in determining stranded costs recovery is that regulation was intended to simulate competition and utilities had an obligation to serve at lowest cost. This is a self-imposed criterion for success in a competitive market. If a utility's costs are uneconomical, then can such costs be blamed on regulation? Certainly mandated costs cannot be attributed to management discre-

tion. However, these costs may be viewed as a cost of doing business in the market if such costs are treated equitably among all competitive suppliers. Regulatory approval of past management decisions does not shift the burden of the costs associated with those decisions to the regulators and, hence, to consumers. An investment that was prudent when made may subsequently become uneconomical owing to changes in technology or economic environment.

The issue is not, therefore, an issue of prudency, but rather an issue of allocation of risks. In a competitive market, shareholders bear such risks. For example, when technological advances brought about the widespread use and affordability of personal computers, suppliers of electric typewriters were not "bailed out" by the government. In addition, the fact that sufficient production capacity exists in other markets does not result in protection of current suppliers from new, more efficient producers.

Another issue of concern is the duty to mitigate stranded costs. Mitigation may include cost reductions, efficiency gains, or other measures intended to reduce a utility's total stranded costs. Measures may also be taken to increase sales to lower unit costs. Although it is universally agreed that utilities should have the duty to mitigate, the risk of successful mitigation is extremely controversial. Many utilities will opt for downward adjustment of stranded cost charges (or true-down) to reflect achieved mitigation efforts, whereas consumers may support mitigation measures that are reflected in stranded costs, with the risk of mitigation placed on the utilities.

Calculation of Stranded Costs

Stranded costs are calculated by comparing a utility's regulated cost structure, or *embedded costs*, to estimated market

prices over a period of time. Stranded cost charges are then designed based on expected sales. True-up or true-down provisions may also be incorporated into the stranded cost charge calculations. Many opponents of this approach to determination of stranded cost charges argue that the level of estimation required results in a greater chance for error and uncertainty. For these constituencies, divestiture is viewed as a way to allow the market to determine the value of the generating resources, as well as to limit potential concerns over market power.

Proponents of divestiture also believe that potential purchasers will recognize maximum value for the resources based on hidden values to be achieved through favorable site locations, such as areas of restricted capacity, transmission constraints, or the ability of the purchaser to improve efficiencies or build market share in the region. However, opponents of divestiture have numerous concerns. Utilities have threatened to file claims against regulators and legislatures for confiscating their assets. Forced divestiture may also create a "fire sale" situation, resulting in depressed prices and higher stranded cost charges. If assets are purchased at bargain prices and true market value is higher, overall costs to consumers increase, and the new supplier will earn extraordinary returns. The transition costs associated with sales and transfers of assets may also increase prices. Many assets may be covered by indenture restrictions, which must be addressed to effect a sale. Without full divestiture, a utility may sell off assets with low market value to gain the "guarantee" of their investment return through stranded cost charges, while retaining assets with high market values, or *reverse stranded costs*, to use in the competitive market. This would allow utilities to avoid having to net potential competitive gains and losses.

Another concern with divestiture is that it does not address the fate of *regulatory assets*. Regulatory assets are costs

that were previously incurred by a utility but have been deferred for future collection under regulatory approval. These assets cannot be sold; therefore, divestiture does not resolve the issue of stranded cost recovery for regulatory assets.

Embedded Costs

In calculating stranded costs, the first task is to determine the embedded costs for which recovery may be allowed. These costs would typically include only prudent costs that have been approved for inclusion in current rates. Future costs or costs that are avoidable would not be included. Variable costs should be included in the original determination of embedded costs to compare a utility's ability to compete against expected market prices. However, if a particular resource cannot be operated in a competitive environment at prices sufficient to cover variable costs of production plus a contribution to fixed costs, then stranded cost recovery should be adjusted to remove the variable costs, which can be avoided by not operating the plant.

Under regulation, a utility's total costs include a return on investment, or *profit*. One issue in development of stranded costs is whether stranded cost charges should provide profit protection or if the intention of stranded cost recovery is only to protect shareholders against loss of their investments.

As noted earlier, mitigation should be addressed in the development of stranded costs. Restructuring policies should determine whether the risk of mitigation should be borne by consumers or shareholders or how such risks should be allocated.

Market Price

One of the most difficult tasks to accomplish in the development of stranded costs is the estimation of market prices.

Utilities would prefer to underestimate market prices so that stranded costs will be maximized. Consumer advocates, on the other hand, would prefer to overestimate market prices so that stranded costs will be set at minimum. It is almost assured that various experts would each estimate market prices differently. It is important to keep in mind that the purpose of estimating market prices is to determine an appropriate level of stranded cost recovery. The ability of a utility to recover its costs in a competitive environment should be measured over time. For example, if market prices are expected to be depressed for a couple of years, followed by several years of high market prices, it would be inappropriate to provide the utilities with high stranded costs that do not take into account the future market potential of the assets. Because of the critical nature of electricity, it is important for suppliers to maintain reserve capacity to ensure the reliability of the system.

It is important to recognize that the restructured electric industry will still not be "pure" competition. There are still barriers to entry, created by transmission constraints and pricing; concentration of existing resources; lead times to build new generation capacity; and the imposition of stranded costs. Although many may contend that market prices will be limited to short-run, marginal costs and will be close to variable cost prices, it should be recognized that competitive suppliers have the incentive to maximize profit. New suppliers will not enter the market unless they believe they can recover their total costs through market prices. Although existing suppliers may be willing to continue supplying the market as long as they are covering their variable costs plus at least a small contribution to fixed costs, these suppliers have an incentive to maximize profit and will not voluntarily set prices at rates so low as to only cover variable costs of production.

Depressed market prices may also be attributed to predatory, or "loss leader," pricing. If stranded costs reflect predatory market prices, then, in effect, the incumbent utility may be able to subsidize its ability to offer such prices, thereby preventing achievement of a level playing field for all competitors.

The influence of market power on market prices should not be overlooked. For example, in many regions throughout the country, a single utility or a utility holding company may own a sufficient amount of the regional capacity to "bid up" market prices. Other effects on market price include the extent of deregulation in the region. To the extent that utilities in surrounding regions still have the majority of their costs recovered through regulated rates, those utilities may be able to accept lower prices for competing in the market.

The market pricing issues are perhaps the most complex to be addressed in restructuring proceedings. The uncertainties associated with market pricing have led many to believe that the only feasible way to handle stranded cost recovery is to have a true-up or true-down procedure that will ensure that utilities do not receive a windfall from stranded cost recovery. However, the use of a true-up has the potential to create bidding subsidies whereby incumbent utilities can undercut competitors' market bids with the assurance that any shortfalls will be recovered through the true-up mechanism. True-downs, on the other hand, may discourage effective mitigation of stranded costs, because all savings would be passed on to consumers. One solution may be the use of a deadband, formulary approach whereby a utility is protected from inordinately low returns and consumers are protected from inordinately high returns created from stranded costs.

Term

Under the administrative approach, total stranded costs are determined as the difference between market prices and

the prices under regulation. The term over which such costs should be developed is also subjective. Because costs under regulation are typically amortized over the life of the assets, the remaining life of the assets may be the period of time over which a utility would request stranded cost recovery. However, the term may also be established based on the period of time prior to the requirement for new capacity or subjectively determined as a period of time over which the utility should make an effective transition to a competitive environment.

Under FERC open access regulations, the term for stranded cost recovery may be based on contractual obligations. If a contract contains a notice provision for termination of service, there is a "rebuttable presumption" that there is no length of obligation and, hence, no stranded costs. Utilities are expected to attempt to rebut the presumption of no stranded costs by arguing that the appropriate length of obligation should be tied to other time periods, such as the utility's planning horizon.

Recovery of Stranded Costs

The issues associated with stranded cost recovery do not stop at identification of stranded costs and the amount of stranded costs that should be eligible for recovery. The next concern is to identify the customers that should be responsible for paying the stranded cost charges. Many believe that stranded cost charges should be nonbypassable and nondiscriminatory. Under traditional cost-of-service rate regulation, the utility was generally assured that it would recoup its costs (plus a return) from "captive" customers in its service territory.

When establishing a stranded cost recovery policy, policy makers should balance fairness and equity among ratepayers

with other goals of competition. For example, competition in the utility industry is viewed as a prime incentive for economic development—particularly in areas with extremely high electric costs, such as the Northeast. However, should customers who are departing the system through relocation be responsible for payment of stranded costs through the imposition of exit fees? Although it would appear fair and equitable for all consumers who were responsible for the incurrence of stranded costs to be responsible for paying for such costs, it may be impractical to impose such costs on customers who are no longer receiving services of any kind from the local distribution utility. Self-generators pose another problem. Historically, self-generators have been able to avoid all of a utility's costs. Any type of exit fee would be taking away a preexisting benefit of self-generation. However, decisions to self-generate may result in uneconomic decisions from a societal point of view if stranded cost charges can be avoided.

Stranded cost charges may be imposed by a surcharge on transmission/distribution costs. This would ensure that such charges are nondiscriminatory and nonbypassable. However, there may be advantages to assessing stranded cost charges on all suppliers. Because stranded cost charges would become a cost of production, suppliers would have the incentive to mitigate costs to be able to offer a lower market price. The incumbent utilities would also be assigned stranded cost charges, which could be passed on to consumers through market pricing or absorbed by the utility. This has the added advantage of making the imposition of stranded cost charges subject to competition.

Stranded cost charges may be developed as a unit cost per kilowatt-hour. This has the advantage of simplicity; however, such charges may send the wrong economic signals to consumers. The higher charges for higher consumption may continue to influence consumer behavior, when

in fact the costs do not rise because of higher consumption. The use of a customer charge would remove the disincentive to increase load. Rate design should be considered in light of other policy decisions regarding the objectives of deregulation.

Chapter 3

Legal/Regulatory Background and Status Report

Steven R. Hunsicker

Federal and state lawmakers and regulators have taken significant steps to deregulate energy supply markets—specifically, natural gas and, more recently, electricity. As a result, depending on actions already taken or anticipated in the near future on a state-by-state basis, wholesale and retail competition for electricity is becoming a fact of life such that power purchasers in many regions of the country have, or will soon have, access to multiple sellers of electric power. Many sophisticated electricity users (or aggregations [pools] of electricity users) that require large volumes of electricity will be able to take advantage of this competition to significantly reduce net revenue requirements otherwise necessary to meet their power needs.

Large individual campuses or aggregations of schools should be ideal candidates for benefiting from increased competition in energy markets. At a minimum, and as only one example, schools in growing regions should be able to contract for power from power brokers, wholesalers who

combine power users in groups large enough to negotiate discounts with power providers.

This chapter will provide an introduction to federal and state initiatives in the electric power markets, indicate the status of retail competition on a state-by-state basis, and identify available sources of more detailed information. Although this introduction should help the reader assess the opportunities that are currently available or expected in the near future, the extent to which these opportunities may be realized will be directly related to the depth of expertise held by or available to those individuals responsible for the procurement of electric power. In many cases institutions would be well served to identify specialized energy service providers, "power brokers," and other professionals to assist in the evaluation of energy projects, and in the assessment of opportunities for taking advantage of increasingly competitive energy markets. These matters are highly fact specific and require careful scrutiny by qualified individuals so that reliable conclusions and results can be reached.

Background

Since the enactment of the Federal Power Act and the Public Utility Holding Company Act in 1935, the provision of reliable, reasonably priced electric power generally has been governed by command and control government regulation at the federal and state level, rather than by the "invisible hand" of market competition. More recently, however, after the loosening of regulation over such traditionally regulated businesses such as the railroad, airline, and telecommunication industries, government has begun to deregulate electricity. Beginning in the late 1980s, the Federal Energy Regulatory Commission (FERC) began to recog-

nize that power generation, as opposed to power transmission, was increasingly competitive. Accordingly, the FERC began to approve market-based generation rates on a case-by-case basis.* The FERC reasoned that traditional cost-based regulation was not necessary in areas in which the power seller did not have sufficient market power to influence the rates it charged and competitive forces could be relied on to constrain rates. Since that time, technological progress has made the generation of cheaper power possible both in utility-owned power plants and in nonutility-owned projects.

Movement to Wholesale Competition

In 1992, competitive market access was further encouraged at the federally regulated wholesale level by the enactment of the Energy Policy Act of 1992. The Energy Policy Act removed ownership restrictions in the Public Utility Holding Company Act that inhibited nontraditional power producers (often single-asset generation companies that did not own transmission or distribution facilities) from entering the power generation business. It also afforded these entities greater access to utility transmission grids by ex-

*Changes in electric utility regulation at the federal level were presaged by the enactment of the Public Utility Regulatory Policies Act of 1978 (PURPA). Passed at a time when energy shortages associated with the Arab Oil Embargo were a recent memory, this Act was intended in part to augment electric utility generation with electricity produced for the wholesale power market by a small power producer or cogenerator certified by the FERC as a qualifying facility. Under PURPA, local utilities must purchase power produced by qualifying facilities in their service area at "avoided cost" (i.e., generally the costs for both energy and facilities that would have been incurred by the purchasing utility if that utility had to provide its own generation capacity). By allowing certain nonutilities to enter the wholesale market, PURPA sought to encourage efficient power production by cogenerators and small power producers that used advanced technologies and renewable resources.

panding the authority of the FERC to approve applications for transmission services.

By virtue of the Energy Policy Act, Congress sought to encourage access to transmission lines and competitive wholesale markets. The Energy Policy Act gave the FERC the authority to provide access to utility transmission systems to competing sellers of electric power that sought to serve wholesale power purchasers. This allowed power to move between different regions of the country across the interconnected transmission lines of multiple utilities. The prospect of interregional movement of power created incentives for a more economic dispatch of electricity generation whereby power could move from low-cost generation in one region to serve demand and displace high-cost generation in another region.

In 1996, the FERC greatly accelerated the movement to competitive wholesale power markets by the issuance of its landmark order, order 888.* Order 888 generally requires all public utilities that own, control, or operate facilities used for transmitting electric power to let competitors transmit electricity through the utilities' transmission lines on a nondiscriminatory basis, as long as the competitor pays for such service. In essence, order 888 requires that utilities offer competitors the same rates and conditions for using the transmission facilities that apply to the utilities themselves. A companion order, FERC order 889, requires that utilities develop an electrical information system that will give users of such facilities the same access to real-time information enjoyed by the utility.

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*Order 888, *Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities.* 61 *Federal Register* 21539 (May 10, 1996).

Movement to Retail Competition

With one significant caveat, it may be said that by passing the Energy Power Act, Congress made clear that the electric power industry was to move toward a fully competitive market system while leaving the means for implementation to the FERC. The significant caveat is that although the Energy Power Act authorized the FERC to mandate third-party access to transmission lines for bulk wholesale of power for resale (i.e., "wholesale wheeling"), it also specifically denied the FERC the power to mandate access to utility systems for retail sales to end-use customers (i.e., "retail wheeling"). Thus, at present it is up to each state to determine whether and when to open up retail electric markets to competition by affording end-use consumers "retail wheeling" rights and, thus, direct access to alternative providers of electric energy.

The jurisdictional boundary between federal and state authority is subject to change. Several members of Congress, with the support of large industrial customers and power brokers, have introduced bills for new federal legislation that would require all states to open their electric markets to competition by a certain date. The Clinton Administration also favors this approach but as of late 1998 had yet to propose specific legislation.

Whether any such federal legislation will be enacted in the near future is highly questionable. Some legislators question the need for additional federal legislation, given the initiatives taken by most states to implement or at least study restructuring the power industry at the retail level to give consumers enhanced access to alternative providers of electric energy.

Significant industry restructuring will probably continue to be implemented at the state level, regardless of whether it is mandated by federal legislation. In most states the pri-

mary question will be the pace and scope of enhanced retail competition in the power industry, which in turn may be determined by several diverse state-specific issues. For example, individual states may be driven by the cost of electricity relative to other states. In the states that have been first to act—California and certain northeastern states are prime examples—electric costs have been relatively high. California's restructuring scheme, implemented early in 1998, mandates rate cuts for the benefit of consumers. However, low-cost energy states (e.g., certain northwestern states) have less apparent incentives. The projected outcome of retail competition in these states could include the generation of additional power from incremental power generation sources to serve California markets. Arguably, any such incremental generation may have environmental consequences and may increase the cost of power in local markets as supply–demand equilibrium is reached across an expanded geographical area. Furthermore, the issue of stranded costs is a matter of varying concern. (For a complete discussion of stranded costs, see Chapter 2.)

The impact of retail competition will vary among individual states and may not be predicted in many states with adequate certainty. Consequently, states differ greatly as to whether statewide retail competition plans or much more limited "pilot projects" have been or soon will be implemented or deliberated.

State Initiatives

Detailed state-by-state analyses of the various approaches to retail competition is beyond the scope of this chapter, although other sources of more detailed state-by-state information are referenced in the chapter appendix, pages 49–56. Programs in a few states may be summarized, how-

ever, to give an indication of the issues confronting most states. As reported by the U.S. Department of Energy, as of late 1997, 12 states (Idaho, Illinois, Massachusetts, Michigan, Missouri, New Hampshire, New Jersey, New York, Ohio, Oregon, Pennsylvania, and Washington) have active retail pilot programs or direct access programs.

California

Pacific Gas and Electric Company, San Diego Gas and Electric Company, and Southern California Edison Company have been directed to restructure the electric utility industry in California. Such actions were initiated by restructuring decisions made by the California Public Utilities Commission and by restructuring legislation signed by Governor Pete Wilson on September 23, 1996. In broad terms, the utilities' implementation of the restructuring initiatives have involved 1) delineating certain facilities as either local distribution facilities (subject to state jurisdiction) or transmission facilities subject to the FERC's jurisdiction, 2) conveying operational control of designated transmission facilities to an independent system operator, and 3) applying to sell electric energy at market-based rates using a power exchange. Under the utilities' restructuring, the traditional market structure that features vertically integrated utilities (i.e., utilities engaged in the generation, transmission, and distribution of electric power to customers in defined service territories at cost-of-service–based rates) will be replaced by a new market structure that allows sale of power by multiple sellers to retail distributors and end users at market-based rates. Such market-based sales of power will be facilitated by nondiscriminatory transmission service provided under tariffs of general applicability administered by the independent system operator. To deal with utility stranded costs, a competitive transition charge will be calculated as a function of the difference

between the generation component of the existing utility tariff and the power exchange price.

To address regulatory concerns as to the utilities' market power in power generation markets, the utilities have agreed to divest themselves of significant portions of their fossil fuel generation capacity. The difference between the prices received for such plants and the utilities' book value of such plants will be subject to stranded cost recovery.

New York

As of early 1998, the New York Public Service Commission has approved restructuring plans submitted by Consolidated Edison, New York State Electric and Gas, Niagara Mohawk, Orange & Rockland, Rochester Gas and Electric, and Central Hudson. The method for recovery of stranded costs has not been finalized, however. Under the varying details of the utility-specific plans, retail competition will be available by a certain date, with different levels of guaranteed or expected rate decreases for different customer classes. As indicated by filings submitted to the FERC, New York anticipates the establishment and implementation in 1998 of an independent system operator that will be responsible for balancing load and electricity generation and the dispatch of electricity through a power exchange. Bills before the New York legislature call for full retail customer choice to be implemented by September 2000.

New York has experimented with pilot programs that could serve as useful models in other areas. One program, proposed by Dairylea Cooperative and approved by the New York Public Service Commission, includes dairy farmers and food processors in the service territories of the four largest utilities. Dairylea plans to purchase power for the aggregate needs of its members. Outside power suppliers

or aggregators may compete against utilities for this power business. Dairylea has forecast that the pilot program will save end users 10 to 20 percent on their electricity rates.

The New York State Public Service Commission also has approved certain arrangements whereby cogenerators have been permitted to sell retail power to nearby industrials. Depending on local laws, this example suggests that institutions in other states may investigate whether cogeneration units can be installed to meet energy requirements, with excess power marketed to nearby industrial or commercial loads. The feasibility of such an approach seemingly will depend on state-specific issues such as the definition of public utility (i.e., does an institution become a regulated public utility by selling power to end users?) and the availability of the transmission and distribution services necessary to market power that is in excess of the institution's needs.

Pennsylvania

Pennsylvania passed legislation necessary to introduce retail electricity competition on December 3, 1996. The Electricity Generation Customer Choice and Competition Act will phase in retail competition beginning January 1, 1999. Rate caps ensure that utilities' captive and direct access customers will not experience rate increases. In addition, the Pennsylvania Public Utilities Commission is granted the authority to mandate pilot programs, approve utility restructuring plans, and make decisions concerning recovery of stranded costs by the utilities.

In early 1998, the Pennsylvania Public Utilities Commission approved a restructuring plan for PECO Energy Company that projects reductions in electric bills of up to 15 percent. The Public Utilities Commission is expected to issue orders on the restructuring plans submitted by all

Pennsylvania utilities in summer 1998. Some indication of the potential vitality of retail electricity competition in Pennsylvania is afforded by reports that some 30 energy suppliers have been approved by the Public Utilities Commission to participate in Pennsylvania's pilot programs for retail competition. Recent events in Pennsylvania may have altered this direction.

Appendix

State-by-State Summary Status*

Alabama	State law guaranteeing stranded cost recovery has been challenged in court as prohibiting the development of a competitive, interstate electricity market.
Alaska	Because of the unique circumstances of this huge but sparsely populated state, there has been little activity promoting retail competition for electricity in Alaska.
Arizona	Arizona Corporation Commission restructuring plans have been challenged in court by the two largest utilities. Legislative activity may be expected in 1998–99.
Arkansas	The Public Service Commission has considered and approved a plan for the transition to a competitive retail electricity industry as submitted by Entergy, Arkansas, Inc. Large industrial users have attacked the plan as maintaining Entergy market power by providing for the recovery of inflated stranded costs. The Public Service Commission will consider competitive issues in separate dockets.
California	See section entitled "California" in this chapter.
Colorado	Electricity restructuring bills have been rejected by the state legislature. The Public Utility Commission apparently regards

*The information given in this appendix is current as of spring 1998. More detailed state-by-state updates are provided by Strategic Energy Ltd. at www.sel.com/retail.html; by the National Association of Regulatory Utility Commissioners at www.naruc.org; and by PECO at pecoweb1.peco.com/ventures.

	legislative mandate to act as a precondition to regulatory initiatives.
Connecticut	Legislative consideration of restructuring bills is expected in 1998–99.
Delaware	Public Service Commission and utility plans for implementing retail competition are likely to be considered by the legislature and the governor in 1998.
District of Columbia	The Public Service Commission has initiated inquiry concerning retail competition.
Florida	Retail legislation has been introduced in the Florida Senate. The legislation calls for utility restructuring plans by January 1999 and competition by 2001.
Georgia	The Public Service Commission has held workshops on retail restructuring issues, including the status of developments in other states, potential economic benefits, and stranded costs.
Hawaii	The Public Utilities Commission has begun an investigation into electric restructuring.
Idaho	The state has implemented a pilot program, and legislation for retail competition may be considered in 1998–99.
Illinois	Electricity restructuring legislation has been passed and signed into law. Commercial and industrial customers will be able to choose new power suppliers in 1999; residential customers will be able to make this choice three years later.
Indiana	Electricity restructuring legislation has been thwarted by organized labor and by Indiana-based investor-owned utilities.
Iowa	The Iowa Utilities Board has issued a staff report on electric industry restructuring

	and is monitoring developments in other states. Legislative action on a bill calling for competition by January 2000 is possible in 1999.
Kansas	Bills that would implement retail choice by the end of 2001 are under consideration.
Kentucky	Legislative hearings and workshops on electricity restructuring may lead to legislation in 1998–99.
Louisiana	A legislative committee has been formed to investigate retail competition and to consider a legislative proposal.
Maine	Retail choice legislation was signed into law on May 29, 1997 and provides for consumers to be allowed to choose alternative suppliers beginning March 2000.
Maryland	December 1997 orders of the Public Service Commission call for full implementation of retail competition by July 1, 2002. In April 1998, the Maryland Senate adopted electric retail choice legislation.
Massachusetts	Electric restructuring legislation gives rate payers an immediate 10 percent rate reduction, with an additional 5 percent reduction in September 1999.
Michigan	In January 1998, the Public Service Commission adopted a phase-in schedule for a customer choice and direct access program. Under the program, all consumers would have a choice of suppliers by 2002.
Minnesota	Little Public Service Commission and legislative activity reflects the low cost of power in this state.
Mississippi	Public Service Commission staff have recommended implementation of retail wheeling over the years 2001 to 2004.

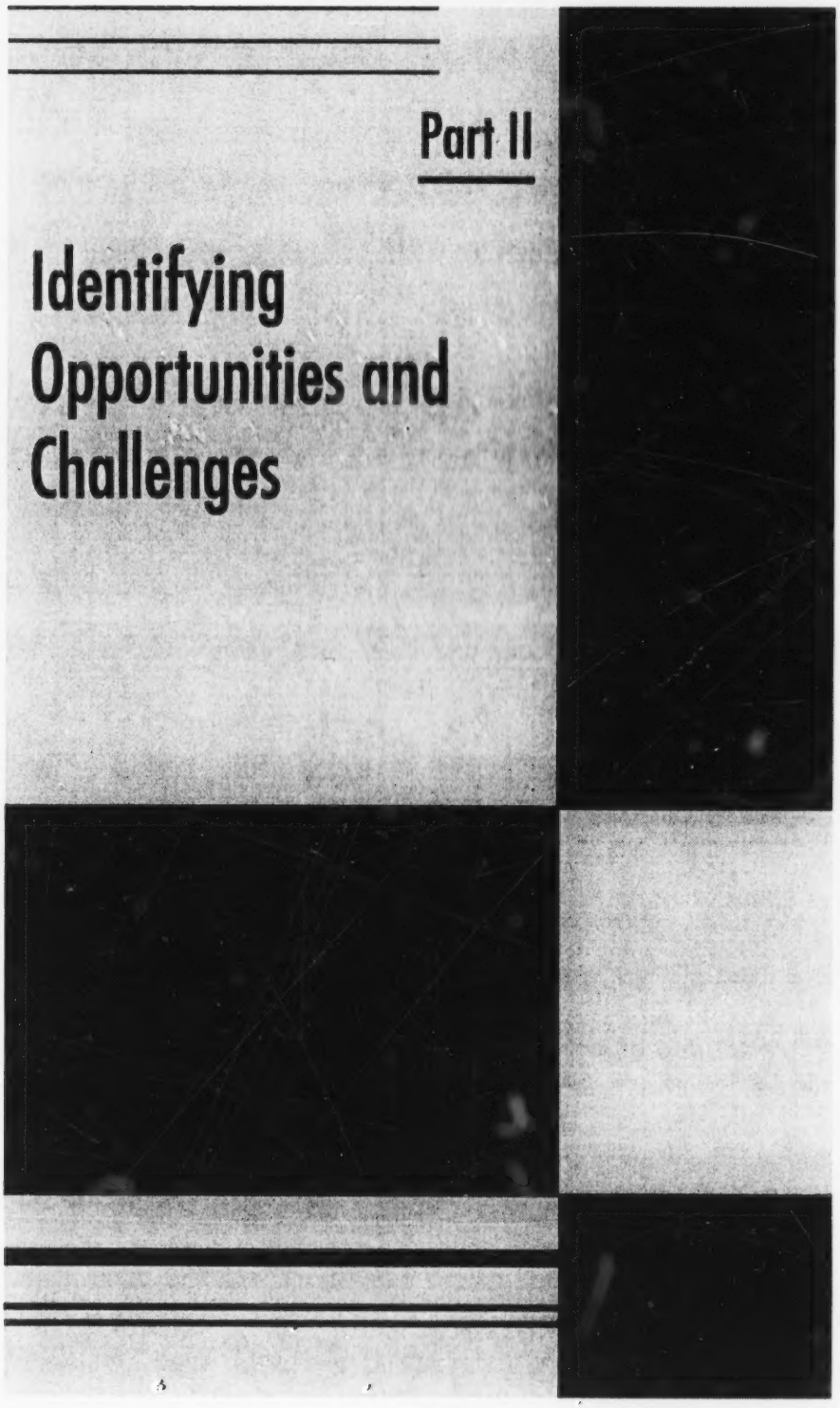
	Implementing legislation may be considered in 1998–99.
Missouri	The Public Service Commission has undertaken a proceeding to investigate retail wheeling and to develop restructuring legislation. The Public Service Commission also has approved a limited plan by Utilicorp in which certain commercial customers will have access to competing power suppliers. Legislation has been introduced that would provide electric retail choice by January 2000.
Montana	Retail competition legislation has been signed into law. All customers will be eligible to choose among alternative energy suppliers by a target date of April 2000. Pilot programs will be required during a phase-in period.
Nebraska	A legislative committee has undertaken a three-year study into retail electricity competition. Public policy recommendations are expected by the end of 1999.
Nevada	Retail competition legislation was signed into law on July 16, 1997. Details of implementation are to be determined by the Public Service Commission. A draft consensus report was issued by this commission in March 1998.
New Hampshire	On February 28, 1997 the Public Utilities Commission issued a final restructuring plan that included a 60 percent stranded cost recovery. Resulting litigation has delayed implementation of retail competition. Future action by the Public Utilities Commission is expected.

New Jersey	The New Jersey Board of Public Utilities has called for implementation of retail competition by mid-2000 and has worked on model legislation. Public Service Electric & Gas has proposed to allow its customers to choose their energy suppliers by January 1, 1999. The plan includes rate caps and guaranteed savings.
New Mexico	A stakeholder group has attempted to develop legislation but has made little progress. The Public Utilities Commission has issued a report attacking sample restructuring legislation.
New York	See section entitled "New York" in this chapter.
North Carolina	Legislation has been approved to create a commission that will study electric industry restructuring, with interim and final reports due January 1998 and January 1999, respectively.
North Dakota	Legislation and Public Service Commission orders provide for study of retail competition initiatives so that restructuring legislation may be considered in 1999.
Ohio	In 1997 a joint legislative committee was formed to study retail competition, restructuring issues, and legislative proposals. Issues include utility tax redistribution, now that the state Supreme Court ruled that the funding for the state's educational system is unconstitutional. The Public Utility Commission has issued guidelines that would allow the aggregation of load to take advantage of load diversity and enhanced purchasing power. Legislation has been

	introduced to allow customer choice of power suppliers beginning January 2000; supporters argue that rates will be reduced by as much as 30 percent.
Oklahoma	Restructuring legislation was signed into law on April 25, 1997. The law freezes rates until a July 1, 2002 deadline for implementation of competition. Efforts have been undertaken to advance this date.
Oregon	Legislation for industry deregulation has failed passage. Other restructuring bills have been proposed and may be considered in the next legislative session. Experience with pilot programs has been limited.
Pennsylvania	See section entitled "Pennsylvania" in this chapter.
Rhode Island	Retail competition legislation was signed into law on August 9, 1996. The legislation calls for direct access to alternative suppliers.
South Carolina	The Public Service Commission and state legislature are considering various proposals to provide retail choice to consumers by 1999.
South Dakota	New customers with usage of 2 MW or more may petition the Public Utilities Commission to select their electrical supplier.
Tennessee	A legislative study is considering retail electricity issues, including the impact of deregulation on the Tennessee Valley Authority.
Texas	Electricity restructuring legislation is expected to be considered in 1999. Texas has approved an independent system operator providing nondiscriminatory transmission access as part of a restructuring of the Texas wholesale market.

Utah	A legislative task force is studying electricity competition and is scheduled to issue a final report, including proposed legislation, in late 1998.
Vermont	There has been significant deliberation of electric restructuring legislation, but no bill has been signed into law. Further deliberations are expected in 1998. The Vermont Public Service Board has issued a report that calls for full access for all end users by the end of 1998.
Virginia	The State Corporation Commission has recommended a five-year plan to study the feasibility of implementing retail access. Pilot projects are anticipated for the phase 1 period (1998–2001), as is the formation of an independent system operator and a regional power exchange. Implementation of full retail access will be considered in the phase 2 period (2000 to 2002). Washington Gas has proposed a pilot program providing choice of power supplier for customers in Northern Virginia. Virginia's General Assembly has passed a bill that outlines an approach to full competition beginning in 2004. The State Corporation Commission has asked the state's largest investor-owned utilities to file retail choice pilot plans.
Washington	Legislative restructuring may receive renewed consideration. Limited pilot projects allowing selection of alternative suppliers or energy types are in place.
West Virginia	The Public Service Commission has conducted a formal investigation into retail competition.

Wisconsin	The Public Service Commission has suggested moving to full access in 2000. The legislature is expected to consider implementation proposals in 1999. A coalition of interests has developed a structuring proposal for an independent system operator.
Wyoming	A Public Service Commission study recommended the development of pilot projects but concluded that it does not have authority to implement restructuring or retail competition under current law. No legislation had been introduced as of spring 1998.



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Chapter 4

Statewide Policy Issues—Being a Player

Sheree L. Brown

As the nation moves toward deregulation of the electric industry, legislators and regulators will be establishing restructuring policies that will directly affect educational institutions. In addition, many policies will indirectly affect educational institutions by affecting the competitive market and, ultimately, the prices paid for electric power. Environmental and social issues may also be of interest or concern.

The typical restructuring process at the state level consists of legislative committees to study restructuring issues, legislative directives to develop a plan for restructuring, and regulatory commission proceedings to develop and implement the restructuring plan. Many restructuring issues may affect all utilities equally; therefore, development of a restructuring plan may be accomplished through generic proceedings. Issues particular to a specific utility generally require adjudicative proceedings with that utility and any affected parties. Typically, the parties

in restructuring proceedings or those involved in restructuring committees include investor-owned utilities, regulatory commission staff, consumer advocate groups, large industrial consumers, and suppliers that are hoping to enter the new market.

The issues being debated, which are more fully discussed in earlier chapters, include market structure, market power, public policy, and stranded costs (discussed in chapter 2). Unfortunately, it is often the case that the intervenors in regulatory proceedings may not have the financial resources to adequately represent consumers' interests against investor-owned utilities, based on ownership of the information required to evaluate restructuring issues. Typically, investor-owned utilities are also able to pass on their litigation costs to consumers. Because of their limited financial resources, the various consumer groups tend to concentrate on a limited number of issues that are most important to them. The issues most important to educational institutions may therefore be resolved in a manner that may not favor their needs.

Universities, colleges, and schools are large consumers of electricity, committing a substantial amount of funds to the purchase of electricity and other energy services. In many cases educational institutions are also leaders in the support of national policies designed to protect the environment and the use of the nation's energy resources. Many colleges and universities are essentially electric utility systems with distribution systems and, in some cases, generation facilities. Educational institutions thus have a unique perspective on restructuring issues and can be significantly affected by the resolution of these issues.

Influencing the restructuring debate can result in substantial savings. At a minimum, legislative and regulatory restructuring activities should be monitored at both the federal and state levels. This monitoring effort can be ac-

complished by the institution itself or a group of institutions, or by other constituencies with similar interests. By understanding the issues, the impact of the issues can be measured. The decision can then be made for the institution to become more actively involved in deregulation activities when it feels that its interests are not being adequately represented by another party.

Participation in restructuring proceedings can be expensive, but the savings typically far surpass expenditures. A representative of the institution may sit on a committee to identify restructuring issues and develop ways to resolve those issues. Regulatory proceedings may entail developing comment papers, reviewing other parties' positions, filing of testimony, cross-examining other parties' witnesses, submitting a witness for cross-examination, briefing, negotiating a settlement, and mediating. Issues that may be of particular concern to educational institutions include stranded costs, the ability to aggregate load for joint procurement of energy services, incentives for energy efficiency, treatment of cogeneration or qualifying facilities, and the elimination of market power. Furthermore, state-run universities may want to evaluate whether formation of a "state-run utility" would allow better and more instantaneous access to the competitive market.

Opportunities for Reducing Costs

In some states procurement restrictions may require modification to allow universities and school systems to develop effective procurement processes for the deregulated electric environment. There may also be other opportunities for reducing costs and protecting the interests of universities and school systems in the deregulated environment. The institution should assess these opportunities, then ac-

tively participate in restructuring policy-making activities to ensure that the ability to take advantage of such opportunity is not impeded. Such opportunities may include protection of existing negotiated rate discounts, wholesale competitive opportunities, stranded costs, financing, cogeneration, environmental restrictions and corresponding incentives, participation in pilot programs, and aggregation.

Protection of Existing Negotiated Rate Discounts

Many institutions currently have discounted rates that have been negotiated with their respective jurisdictional power suppliers. It is possible, even in a deregulated environment with competitive choice, that the interests of an institution, or a group of institutions, would be better served by continuing to receive electric service under this discounted rate. If this is the case, it will be important for the involved institutions to participate in the deregulation process in an effort to protect against possible changes that could result in elimination of these negotiated rate discounts.

Wholesale Competitive Opportunities

One option that may be available to institutional consumers is to establish an electric utility to take advantage of wholesale competitive opportunities. In those states where this is an option, it will be important for institutions to protect this ability in a deregulated environment. In those states where this option is not available, it may serve the interests of resident institutions to attempt to influence state utility regulators and legislators to amend or alter the current procurement provisions to allow access to the wholesale power market.

Stranded Costs

Stranded cost is arguably the most contentious issue in the deregulation of the electric industry, and with good rea-

son. The manner in which this issue is resolved has the potential to eliminate any economic benefit that might result from a competitive power market. (For a complete discussion of stranded costs, see Chapter 2.)

Financing

Given the great need for infrastructure improvements within the institutional segment, it will be necessary to determine the impact of restructuring on the institution's ability to finance such projects. For example, restructuring may change the ability of public entities to secure tax-exempt financing for projects. Furthermore, by changing the market for certain services, the way that a facility manager budgets may be affected.

Cogeneration Facilities

It is also important to assess the impact of restructuring on existing and planned cogeneration facilities. Some issues that should be considered include requirements for standby service, protection of existing sell-back contracts, and the ability to use the energy "inside the meter" to avoid stranded cost charges.

Environmental Restrictions and Corresponding Incentives

In the deregulated environment, there may exist new, more restrictive environmental regulations, but incentives may also be available to those who comply. To the degree that environmental regulations and restrictions may change during the regulatory process, it is important for institutions to participate in determining and influencing such changes and to assess the impact on campus utilities. In many cases the use of renewable energy resources is not simply encouraged, but is required, as are conservation and load management. Furthermore, many states are making

available incentives to those producers and consumers of power that make an effort to be environmentally responsible. It is imperative that educational institutions become involved as environmental issues are considered and policies developed for a restructured electric industry. This involvement will serve to ensure that the interests of educational institutions are protected and that these institutions have a comprehensive knowledge of the opportunities and challenges presented by environmental regulations in the new marketplace.

Participation in Pilot Programs

Many states are implementing pilot programs to test the implications of a deregulated, competitive electric industry. These pilot programs present an opportunity for consumers, including educational institutions, to enjoy the benefits of open competition before the ultimate and final deregulation of the electric industry. The duration of these experimental programs varies from state to state, as do the class and number of customers that are eligible to participate. One of the observations made of these pilot programs is that suppliers, anxious to gain a foothold in a new market and cognizant of the relatively short-term nature of the programs, have been willing to cut prices below cost. Although this does not represent an accurate picture of what the market will be like in a true competitive environment, it does offer consumers the opportunity to take advantage of unusually low rates for the duration of the pilot program. As a group of large influential consumers, many directly associated with the state, educational institutions should influence the regulatory process to ensure that they will be eligible for these programs. Furthermore, educational institutions could approach regulators and legislators in an effort to initiate a program on behalf of their institutions.

Aggregation

As deregulation has developed across the nation, there has been evidence of the potential benefits to be achieved through the aggregation of electric loads. The theory behind aggregation is simple and widely accepted. By joining together with many other consumers to form a larger, single group, consumers can enjoy benefits of cheaper electricity that would not be available to them as individuals. Aggregation of electric loads represents a real opportunity for institutions, and the ability to aggregate should be protected during the regulatory process.

Conclusion

As a group, colleges, universities, and school systems represent a large and influential segment of electric consumers. Quite often, these institutions are very active in the political and regulatory arenas in an effort to protect their interests and the interests of their constituencies. Deregulation of the electric industry is of considerable significance to and will have an immense impact on these institutions, both collectively and individually. Furthermore, this process is happening at such a pace that it is imperative that institutions identify the issues being considered, assess the potential impact of each of these issues, and then formulate a strategic plan to enable the institution to realize the maximum benefits available in a restructured market. Active participation in the regulatory process is an essential part of this strategy and will result in benefits to be enjoyed by all institutions, and potentially other consumers, within a geographic region. It is conceivable that participation would be most effective if implemented as a group. For example, there may be advantages to joining together with

other institutions with similar interests within a state to influence the process to the benefit of the group. From an institution-specific perspective, it will be necessary to perform a comprehensive assessment of the current situation for each institution and then formulate a plan to position the institution to benefit from a restructured market.

In summary, restructuring of the electric industry is inevitable and in fact has already begun. By adopting a proactive approach and aggressively preparing for and participating in changes as they occur, rather than sitting idly by while utilities and other parties argue for their interests, institutions have the opportunity to influence the emerging competitive market in such a manner as to yield benefits for many years to come.

Chapter 5

How to Lower Your Costs with the Local Electric Provider

Dan Desmond

Currently, major electricity customers such as universities have many options with their local electric utilities. Utilities are worried about the possibility of losing universities as a customer. Utilities, while wanting to be progressive and open to change, need to figure out how to retain existing load and maintain profitability. Customers expect rate reductions, and while this benefit will most likely accrue from lower generation costs, remember that almost all the existing traditional activities are still regulated by state commissions, and utility rate options are approved through traditional rate cases. This chapter contains some ideas for educational instutions to use in the regulated environment that may achieve lower costs in energy today.

Develop an Electricity Profile

It is well worth the effort to develop kilowatt and kilowatt-hour profiles for each electric account. These profiles should include as much consumption history as possible, preferably at least 36 months' worth of data. The profile shows when the university uses electricity, the load factor by month, and whether the institution is a summer- or winter-peaking customer. This information is essential in evaluating other rate options and in taking advantage of incentive rates that may be offered in the future. Figure 5-1 shows one example of a demand profile for a customer with a peak demand of about 5000 kW. Ask your utility for this information. If you have an electronic meter, the information should be available electronically.

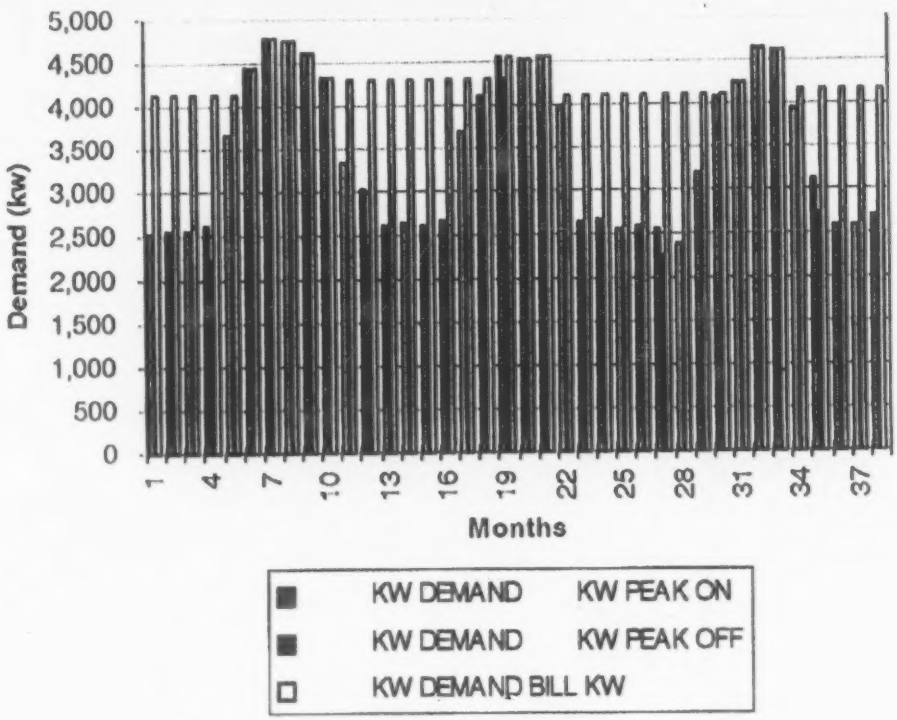

Figure 5-1. *Kilowatt demand history.*

Take Time to Learn the Electric Rates

The more you know, the better, especially if you are interested in minimizing the average cost per kilowatt-hour and getting the most value from your electric utility. Utilities assess a basic customer charge on every meter and typically have a tiered electric rate, with declining rates for greater kilowatt-hour consumption.

In addition, most rates have two demand components for kilowatt charges: distribution demand and power supply demand. *Distribution demand* is the charge for the utility facilities required to serve the meter. These usually include the normal facilities on the "low side" of the transmission substation, such as step-down transformer, service lateral, line protection, and the meter. The customer may pay a minimum distribution demand charge for each meter based on service characteristics and transformer size. See if your utility uses a ratchet clause basis of charging. If so, the customer will pay the demand charge for the highest 30-minute period in the annual billing cycle for the following 12 months.

Power supply demand is the charge for the generation and transmission facilities reserved to serve the university. This charge is usually greater than the distribution demand charge, sometimes by a factor of 10. Some utilities have a ratchet provision for this bill component that may be tied to your winter or summer peak kilowatt demand. Demand charges can make up almost 50 percent of your total electric utility bill.

There are other charges that may show up on your bill, including fuel charges, reactive power charges, and excess facility charges. These will be discussed in more detail in later sections. If you have trouble understanding how the rate affects you, ask your utility for a brochure that dis-

cusses, in lay terms, the components of your bill and the various rate options available to you.

Aggregate Electric Loads

After you understand your electric rates, you will see how important it is to reduce the total number of meters at your campus. Some of the most obvious benefits include eliminating the basic customer charge, reducing electric kilowatt-hour blocks, and combining kilowatt demands to take advantage of diversity on campus. If the university has two meters, and one has a peak demand of 800 kW at 9 a.m. and the other has a peak demand of 600 kW at 4 p.m., you will be billed for these two demands (1400 kW) even though the demands may not occur simultaneously. By eliminating one meter, the total peak demand may be reduced because of diversity without any change in operation. Figure 5-2 shows how this might look graphically.

The more meters that can be aggregated, the greater the diversity of load that is created, leading to more opportunities for demand savings. The utility may charge a fee to combine meters, and there are several ways that this can be done. The meters can be electrically totalized without physical changes, the meters can be tied together to a totalizing meter, or they can be eliminated and a primary meter installed. The cost of each option should be considered along with the potential savings. Your utility can perform this analysis for you and recommend an option to give you the best payback.

Eliminate Facility Charges

You may be paying a facility charge or excess service charge for equipment that is not part of the normal utility service.

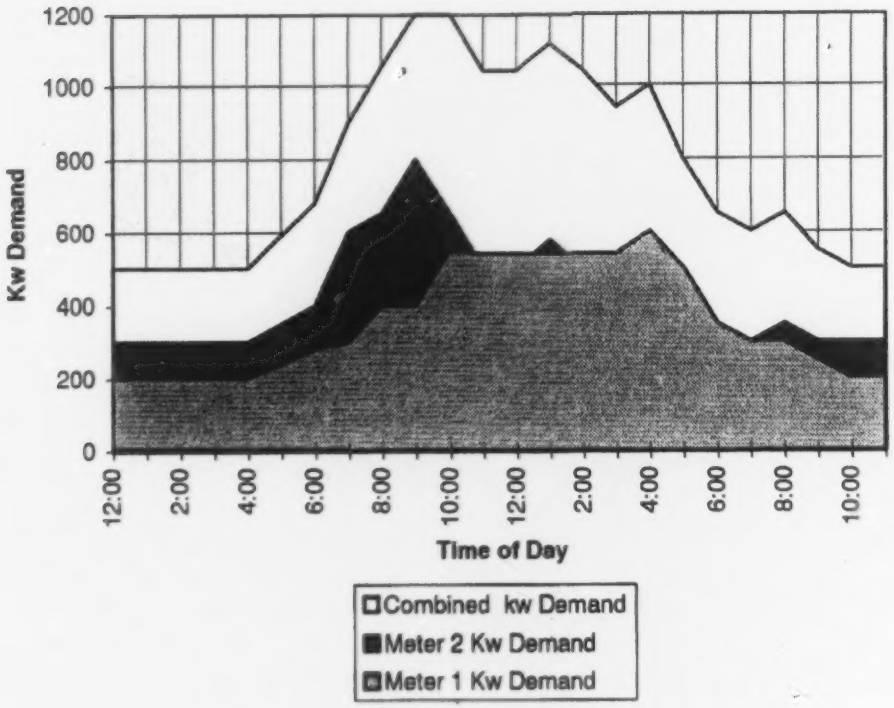

Figure 5-2. *Reduction in total demand produced by aggregating electric loads.*

This charge can be for many things, including outdoor lighting, duplicate transformers, loop distribution services, isolation transformers, and transfer switches. If this type of charge is on the utility bill, ask what it is for. Get details of the equipment, including serial numbers, date installed, reason for installation, function, and any other pertinent information.

It is even possible that the equipment is no longer in use, which would entitle you to a refund, or the equipment may no longer be needed and can be eliminated along with those charges. If the excess equipment is removed, you may be required to pay a fee but will typically recover money quickly. Sometimes the excess equipment can be purchased from the utility and the fee eliminated altogether. Sometimes the

fee can be waived if you demonstrate that the equipment is part of normal service for your type of electric load. This procedure will be discussed in detail in the terms and conditions filed with the state utility commission.

Examine Alternate Rates

Investigate all rate options that are available, and perform comparisons using the most recent 12-month billing data. Each account may qualify for different rates depending on the service voltage and peak demands. Look at experimental rates or pilot rates that may be available. Sometimes the utility will perform rate comparisons at no cost or provide spreadsheet software for the customer's use. Time-of-use rates can save money if consumption is flexible and kilowatt-hours and kilowatt use during high-cost peak periods can be managed or permanently reduced.

Real-time pricing is a relatively new rate option that provides kilowatt-hour and kilowatt prices on an hourly or daily basis. If the institution can respond to changing price signals by deferring demand for electricity or running in-house generation, this rate may be beneficial.

Take Advantage of Demand-Side Management Programs

Incentive payments for energy efficiency are on the way out but are still worth looking into. Some utilities may still give rebates for retrofit lighting improvements or other efficiency upgrades. Ask about these programs and whether they are being phased out. In some cases utilities will provide free feasibility studies or audits to help identify cost-saving measures. They may have a list of recommended

vendors that provide discounts for participants in utility-sponsored demand-side management programs. Even if money is not available through rebate programs, the university may still consider kilowatt-hour reductions through retrofits and renovations of electrical equipment. The cost avoidance continues indefinitely.

If you are expanding your campus and adding new services, ask about economic development incentives or cogeneration deferral programs. These may be available, but information on them is usually more difficult to obtain. Call the state utility commission and ask for their policy on these incentive rates.

Investigate Long-Term Contracts

Talk with the utility about discounts for long-term contracts. In the early stages of deregulation, the utility may give you a discount of 5 to 10 percent for agreeing to buy power from the utility for the next two to five years. Don't commit for longer terms, because better offers may become available once deregulation is instituted.

While discussing contracts, try to negotiate other deals, including aggregation, elimination of facility charges, and some of the other items mentioned earlier. Remember, the utility wants you to stay connected. A long-term contract with you will be beneficial to the utility, even when it includes the hard-won price reductions.

Know Who to Deal With

Your facility may be assigned to a commercial engineer or an account manager from the utility company. People in these positions usually have limited authority and are not

the utility decision makers. Develop relationships with utility employees at multiple levels, starting with the chairperson, vice president of rates, and vice president of energy services. Keep discussions at the highest levels possible. Because you are a large customer, you should not have any problem gaining the highest access within the utility.

Cooperation is the Key

You will always remain connected to your local utility. A strong, productive working relationship is vital to maintaining excellent service. You and your utility should always strive for a win–win situation that provides mutual benefits.

Chapter 6

Taking Advantage of Deregulation

D. Michael Cornwell

Needs Assessment

The first step in selecting a strategy for taking advantage of deregulation is knowing the needs of your facility. Questions that will help you determine your goals include the following:

- Is your university, college, or school in great need of savings because of budget cuts, budget overruns, or other circumstances? Do you simply want immediate savings to go to the "bottom line"?
- Is your energy infrastructure old, inefficient, and in dire need of replacement or repair? (Energy infrastructure is defined as all energy conversion assets such as lighting; heating, ventilation, and air conditioning; or any other energy conversion asset.)
- What other physical plant or infrastructure (not necessarily energy infrastructure) needs does your facility have?

- If energy efficiency improvements are successful, can the savings be captured and utilized for paying for necessary improvements, as well as other physical plant needs that may not produce a savings stream?
- Is upper management open to doing business differently?

Answering these questions can help facilities managers determine how seriously and comprehensively they approach the possible benefits of deregulation and other energy-related matters. If the facility has any infrastructure needs, actions can range from a passive approach of waiting for energy rates to drop, if at all, to the development of a more aggressive approach in which any future rate reductions are used to help implement a facility improvement plan.

The discussion in this chapter assumes the most common situation among educational facilities today—that there is old, inefficient equipment on site, large backlogs of deferred operations and maintenance projects, and limited capital dollars for energy infrastructure improvements. The discussion also assumes that upper management is open to change and will allow the physical plant department to keep all or some of the operations-and-maintenance savings derived within the department.

Energy Asset Management

Deregulation may bring about the electric utility savings boost needed to package and implement multiple energy projects. These energy projects may also create a savings stream on their own that in turn could pay for other infrastructure needs that are currently not funded in the budget. The concept is to utilize the existing funding source

(i.e., the existing budget), create savings, and then amortize the savings to finance improvements and possibly a part of the institutions' "wish list" of nonsavings projects.

Figure 6-1 shows an example of a simple paid-from-savings concept in which a project or group of projects generates positive cash flow the first year, has a payback period of seven years, and can continue to provide a return on the investment indefinitely. This example assumes someone is willing to invest in the project, which is not typically a problem in the current competitive energy services marketplace. If the facility itself has its own capital to invest, the interest expense can be reduced or saved. There are multiple financing options and structures available to meet the specific needs of any institution.

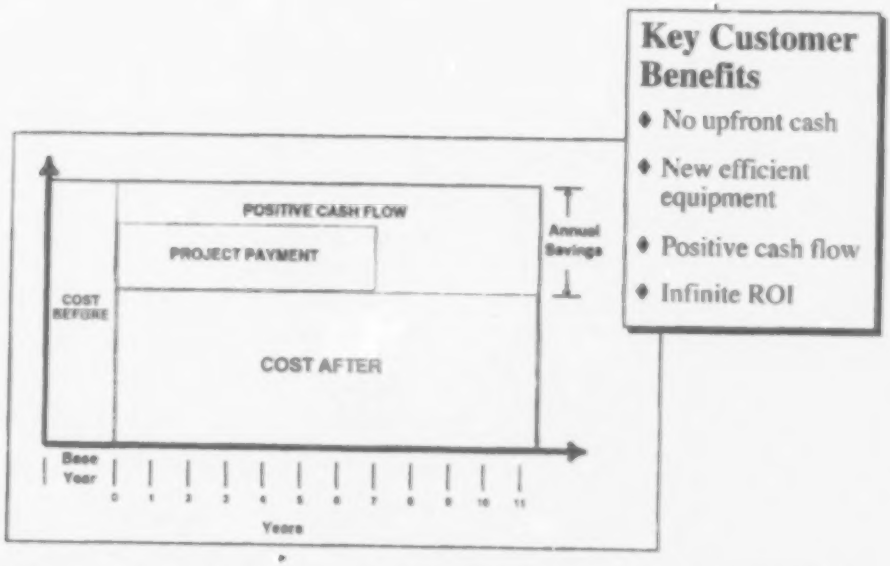

Figure 6-1. *An example of a simple paid-from-savings concept, in which a project or group of projects generates positive cash flow the first year, has a payback period of seven years, and continues to provide a return on investment indefinitely.*

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Lower energy rates brought about by deregulation can provide a paid-from-savings jump-start for the project. Even if deregulation has not occurred in your state, an electric utility may be willing to exchange savings now for an early commitment to procure electricity from the company. The acceleration of deregulation savings will be discussed further in the energy supply section.

Selecting an Energy Partner

As when selecting any company, conduct interviews, check references, review previous energy projects, and solicit preliminary ideas for your situation. There are an increasing number of energy companies currently emerging in the marketplace that may provide services that match the institution's needs. These companies range from utility-based energy supply companies to the more traditional performance contract-controls manufacturing-based firms. Choose an energy partner that best matches the university's situation. For projects that simply involve one small energy improvement or maintenance application, a reputable local mechanical or electrical contractor may work fine.

When selecting a partner, know your core strengths as they relate to energy and select a firm that complements your abilities as a manager and can address specific needs. Typically, this is what you will likely find about yourself and your institution:

- Energy is not a core competency.
- There is no overall "energy master plan" in place.
- Energy infrastructure needs investment.
- Funds are extremely scarce.
- Energy accounting and bill processing are tedious.
- Environmental compliance is complicated and costly.

- Need trusted advice regarding energy systems.
- Am interested in a turnkey energy provider.
- Don't know who to turn to—it's a turbulent energy marketplace.

Regardless of the situation and which firm is chosen, a winning energy partnership should include the following capabilities:

- Fuel procurement services, including electricity, natural gas, oil, propane, and coal
- Identification and implementation of cost-saving projects
- Energy measurement and accounting services
- Operations and maintenance alternatives
- Continuous opportunity assessment
- Multiple financing and ownership alternatives
- Management of environmental compliance
- Risk management
- Trust and teamwork

Structure for Comprehensive Energy Asset Management

To illustrate a comprehensive approach to energy asset management, Figure 6-2 shows an example of an energy partnership between an energy company and a university.

The university wanted to fix some infrastructure problems and reduce energy costs. Working together, the supplier and the university identified and packaged multiple energy projects, including district heating and cooling plant improvements, lighting retrofits, energy management system changes, and air distribution work. The figure highlights the project's financial characteristics, comprehensive scope, and overall benefits. Not only are savings captured

Customer A:

- Total floor area: 2.625M sq. ft.
  - 1 @ 1.2M sq. ft.
  - 3 @ 310K sq. ft.
  - 6 @ 65K sq. ft.
  - 3 @ 35K sq. ft.
- Electricity consumption: $7,000,000
- Fuel consumption: $1,500,000

List of Projects

Project Area	Cost Savings	Implementation Cost
Energy Management System	$212,500	$295,000
Lighting	$159,375	$548,390
Re-Allocate Electricity Costs	$100,265	$0
Central Plant	$503,560	$2,759,425
Air Distribution	$261,720	$910,800
Total	$1,237,420	$4,513,615

Figure 6-2. *An example of an energy partnership between an energy company and a university.*

Deferred Capital Expenditures

Project Area	Implementation Cost	Efficiency Projects	Deferred Capital Expenditures			
			0-5 Years	6-10 Years	11-15 Years	Total
Energy Management System	$295,000	$295,000	$0	$0	$0	$0
Lighting	$548,390		$182,797	$182,971	$182,971	$548,391
Re-Allocate Electricity Costs	$0		$0	$0	$0	$0
Central Plant	$2,759,425	$169,425	$1,730,000	$430,000	$430,000	$2,590,000
Air Distribution	$910,800	$910,800	$0	$0	$0	$0
Total	$4,513,615	$1,080,225	$1,912,797	$612,797	$612,797	$3,138,391

Energy Partnership

- **Financial Benefit**
  - Pre-Financing Savings: $1,237,420
  - Investment: $4,513,615
  - Net Savings per Year: $520,000

- **$8.7M Net Present Value (25 year equipment life)**
- **Fair market buyout at end of 10 year contract**

Services:

1. Detailed Field Survey
2. Project Identification
3. Savings Analysis
4. Implementation Sources/Costing
5. Project Management
6. Project Commissioning
7. Evantage finances all projects
8. Assumes responsibility for energy accounting and pays bills
9. Monitors energy consumption
10. Acts as energy efficiency manager
11. Acts as energy purchasing manager

Figure 6-2. *Continued.*

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Benefits of a Winning Partnership

- Focus internal resources on core mission
- Renew energy infrastructure
- Eliminate some capital expenditures
- Reduce operating costs
- Fuel procurement services
- Management of environmental hazards and compliances (lighting materials, refrigerants, air/water quality)
- Access to electronic billing and payment services

Next Steps

- ❑ Complete Questionnaire
- ❑ Preliminary Analysis and Proposal
- ❑ Letter of Intent
- ❑ Final Analysis and Proposal
- ❑ Formal Contract
- ❑ Procure
- ❑ Construct
- ❑ Commission Equipment
- ❑ Training for Operators
- ❑ Operate

Figure 6-2. *Continued.*

through efficiency measures and energy procurement, but future capital requirements are lessened or deferred.

The financial analysis of the program indicated a net present value of $8.7 million for the university. This value was based on the more than $500,000 annual net savings after project costs, including financing. A key to the success of the program is utilizing the buying power and risk management services of the energy company to lower the rates paid for electricity and natural gas in the open market. The rate savings, although not large, provide an additional ingredient to make the program successful. The fuel management services also significantly shift future market price risk off the university.

A good tool for evaluating technical and financial project business plans is the Opportunity Assessment Model, sponsored by APPA: The Association of Higher Education Facilities Officers. Evaluating these comprehensive projects on an investment basis is critical and should be done on all projects, regardless of size. For the example shown, the university not only will obtain vital infrastructure renewal and positive cash flow, but also will be able to concentrate on its core mission of education and research.

Strategies and Options to Consider

The following discussion highlights several additional ideas to consider when structuring an energy asset management "deal."

District Heating and Cooling

Concentrated heating and cooling loads, such as those that occur in a campus environment or an industrial site, lend themselves to a centralized heating and/or cooling plant.

Depending on the situation, construction of a new plant may be feasible, or expansion of an existing on-site or nearby plant may be more practical and economical.

Another cost-saving alternative is to combine the operations of multiple area-wide plants under one management team and, depending on the on-site requirements, implement a roving team for operations and maintenance. Other sites may lend themselves to district heating or cooling if they are close to a concentrated downtown area. Better commodity rates can be obtained for hot water or steam and chilled water for heating and cooling by spreading the fixed cost of these services over many end users.

Energy companies are willing to design, procure, build, finance, own, operate, and maintain these systems. Cogeneration is sometimes a viable way to economically supply electricity from these plants. The energy company wants to market thermal energy to surrounding customers and sell any excess generated electricity to the regional power pool. As excess generation capacity from utilities and independent power producers begins to "dry up," new capacity from a merchant plant is attractive. A merchant plant is defined here as a cogeneration plant that is oversized in terms of electric generation, enabling its owner to market the excess capacity to other users. A host for the plant—the university, industrial plant, or municipal plant—may want to take an equity position in the plant and share in the profits of the electricity sales.

Bundle All Projects

Now is the perfect time to capture rate savings from deregulation and bundle them with the savings from energy projects, especially if the institution has already "skimmed" the energy savings associated with simple, relatively quick payback projects such as lighting retrofits. Sometimes, this

bundling can be difficult to accomplish; if energy projects are forced to stand on their own, rate savings from deregulation may make them harder to justify. Unfortunately, if savings have not been captured by the physical plant and are passed up the organization in the form of a budget reduction, they cannot help fund other vitally needed infrastructure improvements.

All institutions must make priority decisions concerning any savings, but the more energy projects are bundled together, the more overall impact they will have and more infrastructure renewal can be accomplished. Bundling can be done by joining projects with attractive short-term paybacks with projects that are needed but, on their own, would probably not get funded until an emergency situation arose. The overall payback is more than the two to four years for lighting but shorter than the 20 years for a chiller—probably in the seven- to ten-year range, which is usually palatable for financial officers and lending institutions. Larger projects also typically make the institution more attractive and more competitive. Furthermore, there still may be room for positive cash flow or funding of projects with little or no energy savings, such as roofs, or cable replacement projects associated with on-site electrical distribution.

Determine Project Responsibilities

Although detailed financial and contract options are too numerous to discuss here, there are five levels of responsibility that can be part of the structure of the arrangement.

Complete Energy Asset Management

Partner with an energy supplier who can provide engineering, procurement of equipment, construction, financing, ownership, and ongoing operations and maintenance services. This energy partner would also be responsible for

supplying fuel and electricity for energy assets. This may include risk management in terms of commodity markets, hedging, and guaranteed saving and guaranteed performance. The firm would also provide billing and accounting functions. This approach is full turnkey energy asset management. Instead of buying a chiller, a lighting system, a boiler, or fuel, the university would be purchasing chilled water, lumens, steam, and hot water. Ironically, this is how electricity is currently purchased, on a service or commodity basis.

Engineering, Procurement, Construction, Financing, and Operations and Maintenance

In this type of arrangement, the third-party energy partner provides the same services as above, with the exception of ownership. This entails a different financial mechanism that places the ownership on the institution's balance sheet. Ownership may have significant tax and bond rating implications.

Engineering, Procurement, Construction, and Financing

In this type of responsibility assignment, the institution handles the ongoing operations and maintenance responsibility, including fuel and electricity procurement, and retains ownership. The energy company identifies and designs/builds the energy projects and manages financing for them.

Engineering, Procurement, and Construction

In an engineering, procurement, and construction arrangement, the energy company provides design/build services only.

Engineering

In this type of arrangement, the energy company provides project feasibility and detailed engineering only. The company would identify and possibly provide detailed engineering for energy saving projects.

Commodity Supply Options

Explore Local Provider Deals at or Before Deregulation

Explore the willingness of the existing local utility to provide incentives, pricing discounts, cash payments, free equipment, and energy services in trade for a commitment to continue procuring energy from that company for a specified period. The time to negotiate is even before full deregulation occurs. Utilities may not know as much about the issues as the facilities officer, if the manager has done his or her homework. Utilities typically have not had to price anything for individual customers; instead, they price services based on entire rate classes.

In individual states, stranded cost amounts may not be determined to date; much is still unknown. The utility may be willing to gamble on the unbundled energy and capacity costs. A utility may offer a concession based on emotion rather than good financial sense so that it can retain an existing customer. The company does not want the media to announce that it has lost a customer to a rival energy company even before the market has officially opened. However, this window of opportunity is rapidly closing. As the utility gets more experience and hires new employees from the competitive world, it may be tougher for customers to gain an advantage.

What kind of deal should be negotiated? What terms should it include? How much incentive should it offer? These are tough questions, but managers must explore what local utilities offer. If the utility is willing to negotiate now and offer firm savings and/or incentives, an excellent deal might be obtained.

Perform a sound financial analysis. Try to determine the opportunity costs and risks of the electricity price or deal. If the institution feels comfortable, limit the term of the contract to less than five years and take the savings now. This decision depends largely on the risk profile of the institution.

Don't forget that deregulation will affect only the energy portion of the current electric bill, which is typically 40 to 60 percent of the total bill. The remaining portion—delivery costs—will remain regulated. The existing electric utility will remain the energy delivery company.

Before deregulation, the local provider has a potential advantage in winning over customers. If it is willing to provide concessions on the total bill now in order to keep the university, college, or school as a customer, the financial benefits could be significant. After deregulation, the local provider will not legally be able to offer special rates for energy delivery. However, some providers may not be able to discount the bundled rate even before deregulation.

Fuel Arbitrage

If your facility has alternative fuel options available, consider placing in the contract with the energy partner the ability for the supplier or fuel manager to change fuel based on market pricing conditions. For example, if the facility's primary fuel is natural gas with oil backup and market prices for gas increase dramatically, even though the

facility may have a fixed price, it may still be desirable to interrupt delivery of gas in favor of participation in the market. Depending on the price for oil, the facility's energy partner could divert gas to the high-priced market, make a higher profit, and split the profit with the facility. Fuel and electricity arbitrage can be extremely complex, and only an experienced trader should attempt these transactions. Make certain all the risk is carried by the energy partner.

Commodity Futures

As in any commodity market, sophisticated financial risk management instruments are available to hedge future price risks. These financial instruments are offered by financial brokerage houses as well as some energy supply companies with risk management capabilities. These commodity financial instruments can allow an institution to develop an electricity and/or natural gas procurement plan specifically tailored to its needs in terms of risk and reward. Similar to financing a house, do you pick a variable rate and have your house payment fluctuate with the interest rate, or do you prefer a fixed 20-year payment? This decision hinges on the individual institution's tolerance for risk—whether or not it thinks the current rates are high or low, the amount of its monthly budget, and other consequences of the decision.

A futures contract is a commitment to make or take delivery of a specific quantity and quality of a given commodity at a predetermined place and time in the future. All terms of the contract are standardized and established beforehand except for price, which is determined on the trading floor of a regulated commodity exchange. All contracts are ultimately settled by offsetting purchases or sales or by delivery of the actual physical commodity.

Energy sellers can use futures contracts as temporary substitutes for cash transactions they expect to make at a later date. If the university buys or sells a futures contract and futures prices then change, it will have a gain or loss. Hedging, or the simultaneous initiation of equal and opposite positions in the cash and futures markets, is employed as a form of financial protection against adverse price movement in the market. Futures contracts are viewed by "hedgers" as price insurance while they have price risk in the physical commodity.

Futures contracts are vital financial instruments that some of the more sophisticated energy providers can use to offer value-added services such as fixed long-term pricing, if that is desired. The various instruments are briefly discussed below. The intent is not to make the facilities manager a qualified registered futures trader, but to make him or her aware of what options exist and how they could work at his or her facility, and to encourage facilities administrators to ask any potential energy provider about its risk management capabilities.

Types of Options

There are two main types of options: call options and put options.

A *call option* is an option to buy. A call can be bought or sold. For the buyer, a call is the right, but not the obligation, to buy a futures contract. The seller has an obligation to sell that futures contract if so ordered by the option buyer.

A *put option* is an option to sell. A put can be bought or sold. For the buyer, a put is the right, but not the obligation, to sell a futures contract. The seller has an obligation to buy that futures contract if so ordered by the option buyer.

Sellers of options function in much the same way as an insurance company. They guarantee "coverage" to the buyer

for a fixed period of time, for a fixed amount of coverage and at a cost.

Different Options Products

Cap. The firm agrees to provide customers a ceiling price during a specified delivery window for a premium, or insurance, price. Customers pay for the right to have the firm deliver power at a specified price (strike price) during the specified delivery window. Buyers of a cap want to limit their future upside purchase price of power.

Floors. The firm agrees to provide customers a floor price (will not go below) during a specified delivery term for a premium (or insurance) price. The customer pays for the right to deliver power to the firm at a specified price (strike price) during the specified delivery term. Buyers of a floor wish to limit their future downside sales price of power.

Collars. The firm agrees to sell customers a bundled product that fits the risk of their institution (upside price risk). The sale of a cap to the customer is funded in part by the customer selling a floor back to the firm. This funding of the cap allows for price- and cash flow–sensitive customers to mitigate their upside risk beyond their tolerance level by sharing the cost benefits of downward price movements with the firm. The theoretical strike prices of the ceiling and floor are struck above and below current market, respectively.

This instrument reduces the funding cost of a cap. As with a cap, customers benefit on upside price movement and pay a limited downside price. Customers expose themselves to financial cost only when prices are low and they can afford it.

No-Cost Collar. The firm provides the same structure as a normal collar, with the cap fully funded. The customer pays no out-of-pocket premium for the instrument.

The application is the same as the collar, but the upside cap is fully funded, with a higher limit on the downside price. This is a very attractive product for the cash-conscious customer that wants to limit upside price risk.

Chapter 7

The Challenge of Energy Conservation and Clean Power in a Deregulated Electric Market

Walter Simpson

Deregulation, or restructuring, of the electric industry presents opportunities for energy cost savings. However, it is important for facilities managers to realize that saving money by buying cheaper electricity is not the same thing as energy conservation and efficiency. One challenge of electric deregulation is identifying a strategy or plan that will maintain or bolster the campus energy conservation program while still taking advantage of the cost-saving opportunities that exist in a deregulated electric marketplace.

Campus energy conservation is defined in terms of projects and measures that reduce the total amount of energy consumed, whether measured in kilowatt-hours or British thermal units (Btus). These efforts produce numerous benefits, in addition to saving energy. For example, a lighting retrofit may produce a higher quality light (T8 lamps versus T12s) and maintenance savings as a result of

replacing old lamps with new ones. Installing variable-speed drives with a soft-start feature will reduce the maintenance required on belts and sheaves. A new boiler may reduce fuel consumption and energy costs while serving as a capital improvement.

Energy conservation and efficiency improvements also produce environmental benefits. By saving energy, facilities managers mitigate the environmental impacts associated with energy production and consumption. These impacts include air pollution, acid rain and global warming, oil spills and water pollution, degradation of land and loss of wilderness areas, construction of costly new power plants, and the risk of international conflict and war over energy supplies.

Thus, campus energy-conserving activities are important and worth preserving and enhancing. Energy conservation is a central feature of a "green campus"—a campus that seeks to operate in an environmentally responsible manner.

A deregulated electric marketplace may be less conducive to campus energy conservation for three reasons:

1. In general, lower electric prices will reduce the dollar value of the energy savings produced by energy conservation measures. This will lengthen paybacks and make projects appear less attractive from a financial point of view—although it remains to be seen how quickly and significantly electric prices will drop. The recovery of "stranded costs" by utilities may postpone significant decreases in electric prices in many regions of the country.
2. A deregulated electric marketplace will permit a variety of rate structures. These may be tailored to provide attractive pricing for customers while encouraging increased energy use. Customers who opt for a "declining block" or "marginal" rate structure will see the unit

price of electricity (dollars per kilowatt-hour) go down as their consumption goes up. This provides an incentive to use more electricity. It also makes it harder to justify energy conservation projects because the kilowatt-hours saved by these measures will be discounted, resulting in longer paybacks.

3. Prior to deregulation, many states had set up demand-side management programs that offered rebates and other subsidies to encourage energy conservation and efficiency. These programs are up for grabs as each state moves toward electric deregulation. Total dollars available for incentives may be reduced, perhaps drastically. In some states these incentive programs may be eliminated altogether.

As a matter of prudence or fiscal responsibility, all campuses will want to aggressively take advantage of the dollar savings potential of electric deregulation. Ingenuity, creativity, and commitment will be required to do this, while at the same time maintaining or expanding a campus commitment to energy conservation and efficiency.

Green Power? The Choice Is Yours

In a deregulated electric marketplace, customers will be able to choose their electrical supplier. Options may include continuing to buy electricity from the local utility, buying power from a competitively operated regional power exchange, or buying power via a bilateral contract from an energy broker or independent generator. In addition, campuses will continue to have the option of self-generation.

With choice comes responsibility. Once choice exists, campuses (and all customers) will bear some responsibility for the source of their power and its environmental impact.

From an environmental perspective, not all electric power is equal. Electric power generation ranges from dirty to clean. Electricity produced by coal-fired power plants without pollution controls may be the dirtiest. Somewhere in the middle of conventional generation are oil-fired plants with pollution controls. Natural gas–fired plants are among the cleanest conventional sources of electricity. Although nuclear power plants do not produce air pollution, unresolved radioactive waste disposal and other fuel cycle issues make them unacceptable to most environmental advocates.

"Green power" implies minimal environmental impact. Included in this category are new electrical energy sources, such as fuel cells, and renewable energy technologies (e.g., wind, solar/electric panels or photovoltaics, and certain types of biomass energy). Although hydroelectricity is a form of renewable (non-fossil fuel) energy, already existing hydroelectricity may be excluded from green power programs because buying it will not help expand the green power market. Moreover, in some cases hydroelectricity may be regarded as environmentally damaging (e.g., when natural ecosystems are destroyed by the reservoirs created by hydroelectric dams). Environmental groups and energy marketers in different regions are currently discussing methods of evaluating emissions profiles and assigning energy sources a "green label."

It is important to realize that buying clean or green power does not mean that the actual output of electrons produced by cleaner generation is going to be delivered to the campus. Unless the university, college, or school is self-generating this power, that's not the way it will work. The electricity the campus buys goes into the electric distribution grid and mixes with all the other power. The electricity the campus receives is part of that mix. Buying clean or

green power means paying a supplier of electricity to generate and put into the grid power that is produced in a manner that meets the university's environmental specifications. Thus, the environment benefits (at the point of generation), and the campus receives the power it needs. When the university buys green power, it puts its buying power in the hands of those who are investing in cleaner ways of generating electricity.

Cleaner, greener power is likely to cost more. Hopefully, this premium will be modest for green products developed for larger customers such as college and university campuses. In any event, campuses may be challenged with the need to balance fiscal responsibility and the imperatives of cost saving versus the need to be environmentally responsible. This is a challenge that must be addressed. In this new era of choice, if a campus elects to buy the cheapest, dirtiest power available, it can be criticized as a polluter. On the other hand, buying clean or green power may be cause for praise.

How can campuses determine the environmental merits of prospective clean or green power? How does the facilities manager know how dirty or clean power is?

Many states are expected to pass laws requiring all companies selling power to disclose either their "power mix" or their specific emissions in terms of the amount of sulfur dioxide, nitrogen oxides, and carbon dioxide emitted per kilowatt-hour of electricity. The federal government may require disclosure. Moreover, nongovernmental green power certification programs, such as the Green-e program sponsored by the Center for Resource Solutions in California, may also emerge in various markets to identify and certify suppliers of cleaner sources of electric power.

Chapter 8

Cogeneration and Self-Generation

Lyle D. Wachtel

Cogeneration produces electricity and thermal energy from the concurrent use of one fuel input. It has been estimated that, with cogeneration, it is routinely possible to avoid almost 30 percent of the usual fuel energy that would be required to produce the same energy output in separate phases. The financial and environmental efficiencies are clear. The synergism of less fuel to create the same amount of useful energy results in greater cost avoidance, both financial and in the amount of emissions.

The inherent efficiency and certain specific economic benefits of a cogeneration project are clearly demonstrable. Deregulation opportunities allow owners to competitively manage all phases of the project, from permitting, certification, financing, construction, and acquisition of fuel supply/transportation to byproduct marketing. A natural gas–fired cogeneration plant, in a nonattainment or attainment area, is more easily approved than a power project fueled

by coal or oil. Compared with other combustible fossil fuels, the ability of natural gas to produce the lowest level of emissions, from nitrogen oxides (NO_x) to volatile organic compounds, is unsurpassable. Cogeneration can benefit energy users by providing an economical and environmentally sound source of energy, controlled independently of any external factor. The reliability to provide a base load of power needs and the flexibility to meet peak service needs for either the facility owner or an outside consumer are two powerful capabilities of this technology.

Distributed Generation

Distributed generation is an increasingly discussed, reviewed, and analyzed concept. Whereas cogeneration is the technology, distributed generation is the structure through which cogeneration gains even greater prominence. Distributed generation allows small end users and large utilities to meet their complementary needs for electric power production and thermal energy. Distributed generation basically means the development of site-specific power plants, known as *cogeneration stations*, to meet economically an end user's energy requirements. Depending on the level of service required, a plant could be developed to provide base load, peaking load, or the total load. An external customer such as a hospital, a school, or a local utility can then use the excess generation, either thermal energy or electricity. Just as cogeneration uses one fuel source to produce two forms of energy, distributed generation uses one facility to meet the needs of potentially multiple consumers.

The economic efficiency of cogeneration is the foundation for distributed generation. The financial costs are lower, the efficiencies are higher, the environmental costs are lower

(because of greater efficiency and more use of natural gas), and the payback periods are shorter. In many applications it takes less than a year to get a site-specific cogeneration plant online, and the payback period can often be less than five years. In certain instances this is approximately one-fifth the time frame required to construct and pay for a "nondistributed" or central utility's major power plant. As deregulation unfolds, the propensity for public utilities to invest large capital expenditures for long periods of time within a newly dynamic electricity market is certain to lessen. Distributed generation will be employed to meet the resulting niche market demand created under deregulation and to supplement demand-side management of the existing captive marketplace.

Once a nationally competitive marketplace is established, the cheapest available electricity will be used to fulfill the first tier of electricity demand. The absence of regulation oversight together with the demand for increased transmission capability may cause a squeeze on the price of the commodity and its transportation. This juncture of continued demand and increased prices will serve as a catalyst to make distributed generation (cogeneration) the answer to economical and efficient electrical production requirements. Small power producers and prospective self-generators will be able to serve others' and their own electrical needs by the relatively quick construction and subsequent online production of electricity to meet this demand more efficiently than the national market.

Selling a Cogeneration Facility

The question of how to sell a project actually is secondary to the question of whether a cogeneration facility is

objectively practical. If it is, the project will sell itself, and there is no subjectivity. Determination of the practicality of the project is done by answering three questions: What type of facility is needed? Is this type of facility allowed under current law (regulatory, environmental, and corporate)? If so, is the project financially sound? The answers to these questions will determine whether the project proceeds.

The first question requires an engineering analysis and therefore is rather straightforward. This analysis determines what type of facility is needed, the balance of heat needs versus electricity needs, what size facility is needed, where to locate the facility, who will operate it, when the facility will be required, and how long the facility will meet the institution's needs.

The second and third questions are less straightforward. The question of whether the specified facility is allowed under current law is particularly dynamic. The internal institutional regulations concern whether the institution that is evaluating the project has the administrative foresight to predict the benefits of the project and the ability to implement it. Operationally, as increased fiscal pressure is being put on institutions of higher education, such institutions are responding by utilizing techniques previously employed only in the private sector. Examples include audits of all administrative processes to eliminate inefficiencies, employment of technological advances to streamline complex but repetitive tasks, and thorough evaluation of all policies and goals to determine whether the mission of the institution is being carried out in the most efficient manner possible. Productivity, priority, and quality assessments across all levels are being used. One area that can benefit greatly from such review is the power/physical plant of the institution. Often energy costs are the university's second single greatest expenditure after personnel costs.

Regulatory Concerns

Regulatory concerns present by far the most complex questions. At both the federal and state levels, this is a time of great change in the energy industry, particularly the electricity sector. Several pieces of legislation and associated regulations and actions have provided many new opportunities and constraints. These include the Clean Air Act Amendments of 1990; the Energy Policy Act of 1992; Federal Energy Regulatory Commission (FERC) orders 888 and 889; associated changes to the Federal Power Act, the Public Utilities Holding Company Act, and the Public Utilities Regulatory Policy Act of 1978; and federal legislative efforts to repeal portions of, if not all of, the last two acts. Of all these changes, FERC order 888, which orders wholesale transmission access, is having the greatest impact. This regulation provides the framework that is allowing state governments to analyze retail wheeling at the local level.

The majority of state legislatures are following, to some extent, the state of California's ground-breaking effort to deregulate and unbundle the existing framework of how electricity is bought and sold, even down to the smallest retail residential level. According to the Energy Information Administration, as of June 1, 1998, only two states had no significant legislative activity relating to energy deregulation. The most crucial outcome of any legislation is how new generation capacity will be defined and what cost assessments might be assigned to new generation or, unthinkably, to current cogeneration facilities.

Costs

Competition transition charges are the primary cost component of deregulation. State legislatures, the federal gov-

ernment, and utilities themselves present a large number of ways in which a competition transition charge might be assessed. The charge (referred to as *stranded costs*) is meant to recoup for the investor-owned utility all or a portion of the asset expense represented in excess generation or generation capacity that would be foregone by the migration of its previously captive market to outside producers. A competition transition charge is a cost paid by, in the smallest subset, the group of customers that request open access to the transmission grid in order to purchase their electricity needs from a supplier other than the local utility. In this instance, competition transition charges have been called *exit fees* when applied only to those customers that wish to purchase electricity requirements beyond the "fence" of the local utility. This exit fee is actually an entrance fee to the transmission grid. What is unclear in each instance is if and how competition transition charges will be applicable to self-generation activities and what effect these charges will have on subsequent construction of new facilities. For a complete discussion of stranded costs and the ways in which they might be recovered, see Chapter 2.

The recovery of stranded costs through competition transition charges is the most debated and contentious area of deregulation efforts. Some consumer groups, large nonutility generators, and investor-owned utilities without major (if any) stranded costs view the competition transition charge as a delay and a hindrance to full and free competition. However, regulated utilities and their supporters argue that the public should share in the cost of those assets that were developed to serve them, the construction cost of which has yet to be paid back.

Regardless of where the charge appears, it must be realized that it is not a cost or penalty that is going to be in the equation of electricity costs forever. Most competition transition charges are applied over a period of up to eight or ten

years. This cost can be factored into the cost–benefit analysis of any new generation facility and may be included in the payback period of the facility as a cost avoidance. The value of the facility, which could be maintained for 20 or upwards of 30 years, far outlasts the relatively short-term impact of a competition transition charge. However, the effect may occur over a long enough period for such costs to be included in the finance costs of a new self-generation project, knowing that similar competition transition charge expenses might be included in any direct purchase of electricity.

Environmental Issues

The institution will be in an attainment or nonattainment area for specific emissions. In response to federal Clean Air Act amendments, each state is required to develop implementation plans. In some cases the implementation plans themselves are in flux from the changing knowledge base of how emissions in one area may affect emissions in a downwind area or, within one nonattainment area, how one emission affects the presence or impact of another type of emission. Cogeneration technology primarily uses natural gas, the cleanest burning fossil fuel. The environmental permissibility of a facility utilizing natural gas is far superior to that of one that does not use such fuel.

It is obvious that a nation implementing federal mandates under the Clean Air Act Amendments of 1990 would closely evaluate the potential environmental impact of legislative activity to compel open access. In 1996 the Senate Subcommittee on Energy Production and Regulation requested that the Energy Information Agency review the FERC's Final Environmental Impact Statement, which was prepared as part of the FERC's analysis that culminated in order 888. The focus of the Final Environmental Impact

Statement was on the change in nitrogen oxide emissions relative to open access. Nitrogen oxide was reviewed because of its part in forming ground-level ozone with its associated direct negative effects on the health of nonattainment metropolitan populations, its influence on downwind areas, and related environmental considerations.

The scenarios analyzed used four main variables: the price of natural gas relative to coal, electricity demand, transmission capacity demand, and efficiency improvements in established coal-fired power plants. Not surprisingly, it was determined that, with or without open access, nitrogen oxide emissions would continue to grow. The rate at which they would grow was determined to be more a factor of demand for electricity and the price of natural gas relative to coal. The Energy Information Agency's review concurred with the FERC's Final Environmental Impact Statement that increases in emissions of nitrogen oxides are expected to be larger in the next five to ten years. The outer scope of this increase, represented by the "worst case scenario" (defined by the variables of high electricity demand and increased utilization of coal-fired power plants), resulted in the finding that nitrogen oxide emission increases would be 2 to 3 percent by 2005. Implementation of the Environmental Protection Agency's (EPA's) regulations governing nitrogen oxide emissions of Group 1 boilers will be the primary offsetting factor during this period. These standards are independent of and not affected by order 888.

It is estimated that new gas-fired combined-cycle facilities will increase contribution to national energy production from slightly over 10 percent to almost 33 percent by 2015. The price of natural gas will be the primary factor influencing the realization of this estimate. This capacity will be manifested in the construction of cogeneration plants and in distributed generation and will evolve unaffected with or without deregulation. Because gas-fired cogenera-

tion plants emit less nitrogen oxide and carbon dioxide than coal-fired plants, this capacity will mitigate emissions and utilization of transmission access. Generation and distribution will be localized, thereby nullifying the opportunity to exploit open access. The primary point to be made in this best-case scenario regarding the impact of deregulation on air quality is that standards that are currently in place, and additional ones that are being reviewed by the EPA, are working to mitigate emissions. Distributed generation, spurred on because it is an economical power production structure with or without open access, will be founded on the use of gas-fired cogeneration.

Benefits of Self-Generation or Cogeneration

In the near term, a self-generator's leverage over a local public utility, either with its current capacity or with its proposed capacity, will largely be influenced by the presence and implementation of competition transition charges. If a competition transition charge can be charged on any capacity that is withdrawn from the grid of the local utility, then the potential for new self-generation carries little short-term threat to the local utility. The local utility will be compensated, but in a different manner.

Established or future self-generation projects carry leverage for favorable deferral rates. As noted earlier, the value of any self-generation facility (with a useful life of 20 to 30 years) will exceed any short-term cost (upwards of ten years) that may be experienced as an exit fee to the consumer or as revenue to the incumbent utility. Current facilities may have some leverage if there are economic benefits to be gained by the local electric provider and the facility owner through suspension of generation activities, often referred to as a *deferral rate*. The incumbent utility

gains a customer, and the facility owner receives a rate that is cheaper than its cost to generate.

Regardless, a large-load customer will gain advantages in a competitive deregulated environment, because it is cheaper to keep a customer than to find a new one. If a current plant, the potential to build a plant, or access to outside generation are available as options to a large consumer, then a local utility with relatively high-cost electricity may be pressured, simply by the existence of open-access opportunities, to keep the customer. What was once viewed as an attempt to level the playing field can be exploited by large-load customers to gain a deferral rate or, if there is the potential to build a new plant, a favorable commodity rate from the incumbent utility or a waiver of the competition transition charge.

Two other benefits of self-generation that may be of value to incumbent utilities or to customers beyond the fence are reliability and standby power. In many instances these two benefits can work in concert. In the past, under a regulated environment, self-generators provided their operation with efficient, high-quality equipment to generate all or a portion of the required electrical demand. Specific contracts with the local utility could provide for backup service, supplemental service, or conditional peak use arrangements whereby the facility owner would sell excess generation back to the utility. In these instances both sides win.

Self-Generation and Cogeneration in a Deregulated Environment

Creation of a relationship between an independent power producer and a public or investor-owned utility was secured by the passage of the Public Utilities Regulatory Policy Act.

This act mandated access by independent power producers to local electricity markets to supplement the power requirements of electric utilities. The independent power producer had to be defined as a qualifying facility and thus meet certain terms and conditions specified by the FERC. Currently there is debate at the federal level about whether Public Utilities Regulatory Policy Act, Section 210, which mandates access, is still feasible as the nation makes the transition to a completely deregulated marketplace.

The reliability of the structure of the nation's electricity generation capacity was strengthened by the passage of the Energy Policy Act of 1992, which created another class of nonutility generator, the exempt wholesale generator, and permitted its competitive access to the electricity transmission market. This step served as a catalyst for the expansion of competition and less regulation within the wholesale market. Exempt wholesale generators are free from the constraints included in the definition of a public utility (an investor-owned utility), and a market for their generation is not guaranteed, unlike for a qualifying facility under the Public Utilities Regulatory Policy Act. The Energy Policy Act served to spin off the first group of nonregulated but utility-affiliated production and marketing corporations that could competitively access the wholesale transmission network to sell generation and transmission services.

The inherent reliability of a generation facility, whether an independent power producer, a nonutility generator, a qualifying facility, or an exempt wholesale generator, has been acknowledged and expanded through legislation that has heretofore served to include this valuable asset within the composition of the nation's electricity production industry. This generally complementary and increasingly competitive involvement has benefited investor-owned utilities and nonutility generators alike.

It is hoped that this cooperative relationship can be maintained in an era of deregulation; in fact, more precisely tailored arrangements could be developed. Stand-by power might still be sold back to the local incumbent utility, from which the self-generator might now be obtaining no supply. Backup or supplemental service could be procured from an outside supplier at its own pricing level. Contractual penalties, instead of tariff-regulated penalties, for failure to perform would protect each party.

Planning for a Self-Generation or Cogeneration Project

At the onset of a proposed power project, the financial viability of many facets of the project must be analyzed. An initial analysis for a plant would review the operational and capital considerations of self-generation versus the cost of purchasing electricity in the expected future competitive electricity market. Many previous self-generation projects were initiated because of the captive nature of the consumer by a regulated local public utility (i.e., one source, one price). Response to unfavorable pricing created the primary economic viability component of many generation projects: simply put, self-generation was cheaper. A good analysis will model different assumptions and test for sensitivity.

When the transition period has concluded and a free market for electricity is established, certain generation facilities' financial superiority over simple commodity purchases may be reduced. It is possible that a cyclical period would ensue in which the cost of electricity as a purchased commodity would be cheaper than the capital and operational costs involved in a self-generation facility. During this period, commodity purchases would capture the lowest cost electricity until pricing is such that self-generation regains

its economic superiority. An added factor to be considered is the transmission side of the acquisition of electricity.

Currently it is believed that full use of the nation's transmission and distribution side of the electricity market is not at capacity. This capital-intensive and regulated side of the transaction might at one point reach physical capacity or, through contractual arrangements, meet a theoretical capacity maximum. This event would then create a subsequent pricing signal to spur further generation development. This cycle would occur over long periods and be marked by volatile electricity and natural gas prices. The best insurance against this type of market fluctuation, over the long term, is to use the short-term transition rules to build and finance a cogeneration facility to satisfy the long-term energy requirements of a higher education institution.

It must be repeated that these forecasts are dependent on the sustained development of a commodities market for electricity generation, much like what has occurred with natural gas since deregulation of its acquisition and transportation. A self-generating electricity customer must view the complete economic picture as wholly dynamic. Operation of the facility itself becomes an option, not a necessity. Evaluation of capital costs and the operational tradeoffs of a natural gas–fired cogeneration facility versus the opportunity to purchase electric power on the open market and produce required heat independently creates much more complexity, but also much more opportunity, for an institution. Just as price hedging can be used in acquiring natural gas for the facility, so, too, can it be used in the acquisition or sale of electricity required to meet the project owner's peak needs or the peak needs of an external "customer," whether it be a local utility or another institution.

With commodity trading, there will be differing operational considerations when cogeneration or the opportunity not to cogenerate becomes possible (assuming a viable

heat source alternative exists when cogeneration is not used) through the development of an electricity futures market. Operational gains can be made in both instances: cogenerate and buy gas when power prices are high, and don't cogenerate when gas prices are high but instead buy power when its purchase price is lower than that of gas. The option to not cogenerate but instead to purchase power and produce heat also assumes very high gas prices. This evaluation could be periodically or consistently applied, even on a daily basis, in the case of peak and off-peak demand periods.

After the engineering and legislative analyses have been ratified, the last question is whether the project is financially sound. The cost–benefit analysis required to answer this question will use much of the information gained from the above reviews. What will be the capital costs to achieve the type of facility required? What legislative opportunities or financial constraints might be associated with the project? (Is self-generation penalized or encouraged in any manner through legislative reform?) What are the operational costs of the project, and how long will it take to recoup the investment based on the available offsets?

Provision of capital for large utility projects is typically not a high priority for state legislatures, which view colleges and universities as requiring capital only for teaching and research facilities. The financial soundness of the project and its relative cost may permit an institution to self-finance the project. If this is not possible, the use of a third party to provide some of the capital and share in the savings might be another option to explore.

All of the information gained from the analyses noted above will lead to a correct decision as to whether the specific project makes sense. A viable project in which the technical, regulatory, environmental, and financial issues have been considered will sell itself.

Part III

Taking Advantage of Electric Deregulation

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Chapter 9

Team Formation

Sheree L. Brown, David E. Crawford,
Peter H. Grills, and James J. Sebesta

As the electric industry moves toward competition, it is important for institutions to develop a comprehensive strategic plan for dealing with the issues associated with deregulation. Developing and successfully implementing a comprehensive strategic plan requires building an informed consensus among the many constituencies that may be affected by, or interested in, energy supply decisions. As a result, the planning process has a political dimension, especially for public institutions, that those responsible for developing the plan must take into account.

Forming the Strategic Planning Team

A first step in the planning process is forming a strategic planning team that is representative of the groups within the institution that will be affected by the plan and

responsible for its implementation. Depending on the institution's circumstances, the team should include facilities managers, planners, financial officers, and other administrators.

Consultants from outside the institution are important resources for the team. Consultants offer a much-needed outside perspective and help the institution avoid the "reinventing-the-wheel" syndrome. It is important to realize, however, that just as the institution needs to form an internal planning team with a variety of perspectives, it also needs to assemble a team of consultants from a variety of disciplines to advise the planning team. A lawyer cannot provide an engineering opinion on which the institution can rely, and an engineer cannot give a legal opinion. Different professional perspectives must guide the planning process.

Because public relations may play an important, even critical, role in obtaining ultimate approval of the plan, it is advisable to include a public relations specialist as part of the planning team. Information about the plan must be accurate and effectively disseminated so that the public is not misinformed about the complex issues involved.

Forming the planning team and providing it with the appropriate technical and professional support is perhaps the most important step in strategic plan development and implementation. If team selection is approached with care and forethought, the entire planning process will be more productive, and the ultimate chances for its success will be greatly enhanced.

Constituencies Interested in Plan Development

What constituencies must be considered in the planning process? Obviously the ultimate decision makers are themselves an important constituency. Whether directors, trust-

ees, or regents, each member of an institution's governing board has his or her own perspective on the institution's priorities and policies. Furthermore, the issues involved in utility strategic planning are complicated and extremely technical and may be the subject of vigorous public debate. Those who will make the final decision must have an adequate opportunity to become educated on these issues and understand the views of various interest groups. Waiting to include the ultimate decision makers until late in the process can lead to unfortunate and undesirable results. Consequently, it is critical that they be brought into the process as early as possible.

The customers of the institution's utility system—administrators, employees, faculty, and students—are also an important constituency and may be included on the planning team. The opinions of others may also be sought out and taken into account.

Environmental groups have a strong interest in the planning process, as do government officials with responsibility for environmental regulation and even members of the public at large. Since the mid-1970s, energy conservation, global warming, and other environmental concerns have assumed a steadily greater role in the public debate over energy infrastructure construction and renewal. Some projects have become extremely controversial on the basis of these concerns. Because the utility planning process often establishes the basis for an institution's energy and environmental policies for 30 to 40 years, it is likely that various environmental constituencies will seek to influence the ultimate outcome of the process.

Other governmental officials, such as state legislators, must play a role in the planning process, especially if public funds will be required for plan implementation. At a time when there are many compelling public needs and not enough funds to meet those needs, legislators and oth-

ers involved in the budgeting and funding processes become important individuals who must be considered when building consensus on the plan.

The specific method by which these larger constituencies become involved in the planning process depends on the individual institution and the organizational environment in which it operates. However, opening and maintaining channels of communication with each of the constituencies early in the planning process will result in a healthy discussion of the issues and can only benefit the final plan. Of course, not everyone will be satisfied with the outcome of the planning process, and the plan will no doubt draw strong critics, but seeking out a variety of opinions during the planning process will allow the planning team to anticipate and prepare for possible controversies.

Understanding Organizational and Political Processes

Those responsible for developing the strategic plan must understand their institution's organizational structure and how that structure works both in theory and in practice. They must also have a firm grasp on the political processes outside the institution that could affect implementation of the plan. Such processes include not only legislative procedures, but also environmental and other regulatory processes.

Chapter 10

Internal Improvement: How to Become a More Attractive Customer

B. N. Tripathi

There are several steps facilities managers can take to prepare their facilities to become attractive customers to electricity suppliers. This is necessary because it is entirely possible for two customers with identical electricity consumption to get different rate structures.

At a minimum the following steps are recommended:

- Development of an energy master plan
- Energy conservation measures to improve load profiles
- Demand control and load shedding to improve load profiles
- Thermal energy storage to improve load profiles
- Use of alternate fuels to improve load profiles
- Self-generation to improve load profiles
- Flexibility to use interruptible supply
- Aggregation
- Service upgrades and substation ownership

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Development of an Energy Master Plan

Most large facilities have in place an energy master plan. If an energy master plan does not exist, it is imperative that this be developed to help the institution prepare for deregulation. Depending on the size of the facility, there should be an energy manager responsible for developing, monitoring, and updating this plan.

The three key issues that this plan should address are as follows:

1. *Load profiles.* Annual, monthly, daily, and hourly on-peak and off-peak profiles of electricity, gas, and water consumption must be developed. If the facility uses district steam, hot water, or chilled water, then these utilities should also be included.
2. *Rolling averages.* Monthly or weekly peak and off-peak utility consumption for the preceding 24 to 36 months will indicate the "load creep" at the facility. Load creep is common in all large facilities and is caused by increased or changed usage patterns, addition of office equipment, and addition of conditioned space, among others.
3. *Future expansions and utilization.* The energy master plan should take into account plans for future growth and planned changes in facility utilization.

An energy master plan inclusive of the above key ingredients will assist the facility energy manager in making intelligent and meaningful utility purchasing decisions in a deregulated environment. In such an environment, electricity rates will be most favorable for off-peak consumption and for those facilities that have a relatively flat load profile.

The development of load profiles will also assist the facility energy manager in making meaningful decisions re-

garding potential energy conservation measures and fuel switching during periods of high demand.

Load Profiles and Why They Matter

As mentioned earlier, it is important to remember that all customers will not be equal in a deregulated environment. In fact, two customers with identical consumption levels may very likely be offered widely dissimilar rate structures because of differences in their load profiles.

Load profiles are graphs that plot the level of electrical demand (kW) or usage (kWh) at 15-minute, hourly, daily, weekly, or monthly intervals. Two customers may use the same amount of electricity (kWh), but their infrastructure design or usage patterns may result in widely different on-peak and off-peak demand (kW) profiles. A typical electrical bill consists of, among others, a demand and a usage billing. On-peak demand costs are higher than off-peak demand costs. Most utilities also bill their customers on the peak demand used, or a high percentage thereof, over the past twelve months.

A demand load profile that is relatively flat rather than "saw-toothed" will attract better rate structures. In other words, the base load needs to be as high a percentage of the peak load as possible, and the range between peak and off-peak loads should be as small as possible. Depending on the geographical location of the facility, there are several options available to reshape energy load profile.

Energy Conservation Measures to Improve Load Profiles

Energy conservation measures can reduce energy costs in two ways: first, by reducing the amount of energy that

must be purchased and, second, by reducing electric demand during peak periods. The latter improves or flattens the load profile. The following are some energy conservation measures that could be considered by institutions to flatten the load profile:

- Chilled water and hot water controls and hydraulics can offer opportunities to reshape the load profile through energy conservation. Constant-speed pumping systems should be analyzed for variable-speed opportunities. If the potential exists for variable-speed pumping, and on most campuses it does, then the existing system design must be investigated for two-way valving and temperature reset applications. An integrated approach could save a significant amount of unnecessary pumping horsepower and concurrent heating and cooling of air streams.
- Variable-speed drives on air handling systems are also helpful for reshaping the load profile for electricity usage, if not for demand.
- DDC-based (direct digital control) energy management systems are an important tool to control, reset, and schedule heating, ventilation, and air conditioning (HVAC) systems and thereby reshape the load profile.
- Lighting retrofits offer significant opportunities in reducing both electric usage and demand. Typical lighting retrofits include, but are not limited to, replacement of magnetic ballasts with high-efficiency electronic ballasts, replacement of T12 fluorescent lamps with T8 lamps, replacement of incandescent bulbs with compact fluorescent bulbs, use of reflectors in fixtures, retrofit of exit lights, occupancy sensors, photovoltaic control of exterior lights, and use of high-pressure sodium or sulphur fusion lighting where applicable. Lighting retrofits provide an added benefit of reducing cooling

requirements because of lower heat dissipation from retrofitted fixtures.

- Replacement of existing electric motors with premium and high-efficiency motors is another measure that would help flatten the load profile.
- Free cooling is a measure that can be used very effectively in many parts of the country.
  - Air-side economizers, provided duct space is available for both fresh air and relief air, are an efficient way to cool facilities when outdoor air temperatures and humidity levels permit. Existing economizer systems should be inspected to ensure proper functioning of enthalpy controls and duct dampers.
  - Water-side economizers should be investigated for systems that do not afford adequate space for air-side economizers. A water-side economizer utilizes cooling tower water to cool the chilled water system when ambient temperatures permit.
  - Economizers will generally reduce usage profiles and not demand profiles, because their operation is typically restricted to off-peak seasons. However, depending on system capacity and extent of run times, the reduction in energy costs could be substantial.

Demand Control and Load Shedding to Improve Load Profiles

Systems must be in place to limit peak demand and shed loads as necessary. In many parts of the country, utility billings are based on demand "ratchets" set at a facility. Even though the facility may not consume its peak demand for but a few hours of the year, it may get billed for this demand or a large percentage thereof for the rest of the year.

Energy management systems are a key in controlling or shedding demand. Although "duty cycling" of HVAC and building systems is generally not recommended for facilities, there are other, more desirable approaches available.

Thermal Energy Storage to Improve Load Profiles

In areas that have significant cooling requirements, air conditioning loads can be shifted to off-peak hours by the use of thermal energy storage systems. Although there are several variations of thermal energy storage, currently the most commonly used systems are ice storage and chilled water storage.

Chillers are operated during off-peak hours to make ice either statically or dynamically. Static ice systems are of various types (e.g., ice coils, ice balls, and ice trays). Dynamic ice systems are akin to commercial ice machines, in that ice cubes or shavings are produced for storage. In all cases a heat exchanger is used between the building air handling systems and the ice storage tanks for heat transfer.

Chillers can also be operated during off-peak hours to produce chilled water for storage. The stored chilled water can then be circulated through building air handling systems during on-peak hours to meet cooling requirements.

Thermal energy storage has also been widely used to convert direct expansion refrigerant coils in roof-mounted air handling units to chilled water. This approach not only improves the facility's load profile, but also is a cost-effective option to retrofit and upgrade existing HVAC systems.

Thermal energy storage can be designed for both partial and full shift of the cooling load to off-peak hours. System designers have to analyze several parameters—for

example, load profiles, electric rate structures, and off-peak cooling requirements—to determine which option is best suited for a specific facility.

Use of Alternate Fuels to Improve Load Profiles

Mechanical systems can be retrofitted or replaced to allow for the use of alternate fuels during periods of high demand or high energy rates. Conversion of electric heating systems, duct heaters, and electric boilers to natural gas provides excellent opportunities to flatten electric load profiles and reduce overall energy costs by using a less expensive fuel source. Engine-driven or turbine-driven chillers with heat recovery for domestic water heating or process steam production have been used successfully on campuses and in hospitals to both lower the electric load profile and reduce overall utility costs. Facilities with large air compressors may be good candidates for the use of gas engine–driven compressors.

Self-Generation to Improve Load Profiles

Microturbine technology is currently available to customers with turbines in the 60- to 100-kW range to generate electricity for peaking or demand control applications. An excellent application of this technology is during the summer months in warm climates. Electric demand is typically higher (as a result of air conditioning loads) and gas prices lower during these months; this technology provides an attractive method to flatten load profiles.

Flexibility to Use Interruptible Supply

Interruptible contracts for gas or electricity are generally more favorable than firm contracts. A facility's ability to purchase energy on an interruptible basis makes it a more attractive customer. The utilization of interruptible electricity contracts entails the installation of backup generating capacity. This is addressed in more detail in Chapter 8.

Standby capacity for natural gas can be obtained by installing a propane-air plant. These plants blend liquid propane with compressed air to produce a fuel that has the same specific gravity as natural gas. Although these plants are expensive to operate, the price differential between firm and interruptible gas contracts more than offsets this increase.

Aggregation

Under deregulation, customers with larger base loads will attract better commodity pricing than those with smaller loads. Aggregation of loads can be achieved in the following two ways:

1. *Multiple campuses joining together into a buying cooperative to purchase electricity.* Although this approach has the potential to significantly reduce electric rates, the business and legal ramifications of assembling the cooperative, along with the diverse financial goals of member institutions, may make the process cumbersome and slow.

2. *Aggregation of multiple electric meters on a campus.* Although this approach is more manageable and expeditious, the campus takes on the responsibility of owning, operating, and maintaining the electrical distribution system downstream of the main meter. This approach has been used effectively and, depending on project economics, could provide for an attractive return on investment.

Service Upgrades and Substation Ownership

Electric rates are lower for higher voltage distribution systems. Facility energy managers should investigate the upgrade of electrical service from, for example, 4160 V to 12 kV or higher. An approach that many facilities have undertaken is to build their own 69- or 138-kV substations. Even with the owning, operating, and maintenance costs, the reduction in electric rates provides for an attractive return on investment.

Chapter 11

How to Maintain Energy Conservation Initiatives and Buy Clean Power: Strategies for Campus Energy Users

Walter Simpson

There are a number of strategies that can be employed to maintain or even enhance energy conservation and efficiency programs on campus as the era of deregulated electricity approaches. Accomplishing this task, however, may be more or less difficult, depending on old versus new electric rates and how electric deregulation or restructuring is carried out in each state.

Energy Conservation Strategies

What can campus energy users do to keep energy conservation and efficiency alive and well while still benefiting from the promised cost savings of electric deregulation? Some strategies are given in the following sections.

Get Involved in the Public Policy Debate

With deregulation, "the devil is in the details." Options for energy users will be a function of the restructuring plans formulated for each state. If the state deregulates its electric industry with energy efficiency in mind, "the rules" defining the deregulated electric marketplace are likely to promote efficiency—which will make it easier for the institution to do the same. On the other hand, if deregulation is carried out exclusively to lower rates (ignoring social and environmental goals), the university, college, or school may find itself fighting a steep uphill battle. Thus, campus energy professionals need to get involved in their state's public policy debate to push for continued incentives and opportunities for energy conservation and efficiency.

Policy initiatives that will preserve conservation and efficiency opportunities include the following:

- Creation of "system benefit charge" funds to provide monetary incentives for efficiency projects; ample funding levels for these programs are essential
- Financial incentives for electric distribution companies to promote efficiency
- Restrictions on rate structures that promote electric load growth and, thus, discount energy waste
- Recovery of stranded costs on the basis of kilowatt-hour consumption instead of through fixed charges

Develop a Purchasing Policy Committed to Energy Conservation

Facilities managers should address electric deregulation head-on by developing a purchasing policy that commits their college or university to energy conservation, efficiency, and environmental protection (see chapter appendix, page 138).

Implement Measures that Increase Campus Load Factor and Flatten Load Profile

Facilities managers should attempt to focus their energy conservation and efficiency efforts on measures that increase the campus load factor and flatten its load profile. Load factor is defined as average demand (in kilowatts) divided by peak demand (in kilowatts). The closer the two numbers, the higher the load factor.

In a deregulated electric market, energy conservation and efficiency measures that improve load factor and thus flatten load profiles will be advantageous because they provide cost savings in two ways. First, like other conservation measures, they produce savings by reducing kilowatt-hour consumption. Second, they produce additional savings by reducing demand charges and enabling the campus to attract lower priced electricity. It is anticipated that power marketers will be able to provide lower cost power to facilities with high load factors and flat load profiles.

Conservation measures that improve load factors include demand control and peak load shedding, appropriate use of gas equipment to reduce electric loads, and any conservation or efficiency measure that saves energy and thus reduces demand during a peak period. (There are other ways to improve load factor, including aggregating and joining with other facilities whose load profiles complement yours, i.e., their peaks correspond with your valleys and vice versa.)

Include Energy Services in the Power Purchase

Facilities managers should attempt to include energy services in the university's power purchase so that the power supplier is obliged to assist the facility in achieving load reduction and energy conservation. Energy services com-

panies with experience in energy efficiency are becoming increasingly interested in moving into the power sales field. Count on these companies, and the power producers competing with them, to put together packages of electricity sales and efficiency services. The goal of this approach is least-cost energy over the long run, not just lowest commodity price.

Dedicate a Portion of the Savings from Lower Rates to Energy Efficiency Projects

The dollar savings resulting from commodity price reductions can serve a number of purposes. Facilities managers can reinforce conservation programs by obtaining administrative approval to channel some of those savings into energy efficiency projects. These projects, perhaps primarily targeted at measures that will flatten the campus load profile, will produce further energy cost savings. Facilities managers may also want to direct some savings from deregulation to needed capital improvements. A special deregulation savings fund could be established to finance these facilities objectives. Alternately, either or both of these objectives could be met through an electricity purchasing agreement with an energy services company specializing in efficiency and capital improvement projects.

Insist on Rate Structures that Do Not Undermine Energy Conservation

Bid power contracts with specifications that call for rate structures that do not undermine the economics of potential energy conservation and efficiency projects. One strategy for protecting the economics of potential energy conservation projects is to avoid marginal rate structures entirely. A competitively bid flat rate structure could provide

excellent pricing and cost savings while maintaining incentives for energy savings (which can produce additional cost savings). Alternatively, incentives for efficiency and conservation can be maintained by a rate structure that includes an adjustment mechanism to permit documented energy savings to be credited at the base rate.

Use Life Cycle Cost–Benefit Analysis

Facilities managers can use life cycle cost–benefit analysis to evaluate energy conservation and efficiency projects. A common way of evaluating prospective energy conservation measures is to calculate a simple payback (i.e., the cost to install or implement the measure divided by its annual energy dollar savings). This is a simplified way to determine how many years it takes a project to pay back its initial cost. Facilities often have payback thresholds for proceeding with a project (e.g., five years or less).

However, simple payback calculations underestimate benefits. At a time when dollar savings from energy conservation measures may decline (because of lower rates and/or new rate structures brought by deregulation), it makes sense to more thoroughly identify and quantify all benefits of a prospective project. This can be done by a life cycle analysis, which looks at all costs and benefits over the lifetime of the measure. Thus, an energy conservation measure that also produces a capital improvement (e.g., a new roof, new windows, or a boiler replacement) or maintenance benefit (e.g., a lighting or motor retrofit) will show additional savings and thus is more likely to be done.

Life cycle cost–benefit analyses demonstrate the true value of projects and provide justification for embarking on projects with the kinds of longer simple paybacks that are likely to be seen in a deregulated marketplace.

Make Efficient Design and Construction of New Buildings and Facilities a Priority

Efficient design and construction becomes more important when lower rates and marginal rate structures make it more difficult to undertake retrofits. Generally, it is cheaper to "do it right the first time" than to go back and retrofit.

How to Buy Clean, Green Power

Buying cleaner electric power or "green power" can be viewed as a multistep process.

Study the Local Electric Market

Conduct a careful study of the local electric market to determine campus options and potential costs for clean or green power. Markets for clean or green power are likely to develop differently in different regions. Get to know *your* market. You may wish to solicit proposals from prospective suppliers of clean and/or green power and to conduct some interviews in order to learn the "lay of the land" and prequalify bidders.

By studying the market, facilities managers will learn whether clean/green electricity "products" are being marketed. Labeling programs (e.g., California's Green-e program) may also exist that define environmental standards in terms of power mix, emissions rates, and acceptable sources and certify suppliers and products.

Green power products may be standardized and marketed in a variety of ways. Some products may appeal to residential customers willing to pay substantially more for electricity from newly developed renewable (solar) energy technologies. Other products, based on different environmental standards, may be developed for larger industrial, commercial, or institutional

customers. These less expensive "green lite" products would be cleaner and greener than conventional power or the regional power mix, but they would not meet the more stringent environmental standards of the "pure" green power products that will appeal to smaller users.

Define Campus Clean/Green Power Goals

Does the university, college, or school want to rule out coal- and oil-generated electricity and limit purchases to much cleaner gas-fired electricity and hydroelectric generation? Or does it want to buy new renewable generation, such as wind or photovoltaic power, or a mix of conventional and new technologies? Price will be a factor. The campus may have to pay more for cleaner, greener power. How much more is it willing to pay? The options will be contingent on what the local market can provide.

Will Power Suppliers Have to Prequalify?

The facilities manager will have to decide whether the university, college, or school wants to prequalify power suppliers and thus only allow successfully prequalified and preaccepted suppliers to bid. Prequalification makes sense, given the newness of the market for competitively bid electricity in general and clean and green power in particular. There may be many unproven vendors vying for business. Evaluating bids will be easier if all bidders have demonstrated the capability to reliably supply power based on preestablished environmental criteria. Bidders must also be able and willing to meet the university, college, or school's disclosure requirements. Also, if the university, college, or school is seeking to combine power purchases with other energy services (including energy efficiency services), it may be desirable for prospective vendors to meet criteria or requirements in that area prior to being allowed to bid.

Prepare Detailed Bid Specifications

The facilities manager should prepare bid specifications that minimally address the following issues:

- The electric load for which the campus is interested in buying clean or green power
- Environmental criteria (or product label) used to define the clean/green power on which the university is asking prospective suppliers to bid
- Disclosure requirements to guarantee that the power being generated for the campus does in fact meet agreed-on environmental standards

Concerning disclosure, standardized products certified by a government body or a credible independent third party may eliminate much of the worry on this issue. In the absence of such certification, the specification will need to detail disclosure requirements that, if met, will satisfy the university, college, or school that the power it is buying is coming from the sources agreed to and is as clean as it should be. The energy manager will also want to ensure that the total demand on the supplier's clean/green power supply is not greater than the supplier's capacity and output. This can get very complicated, given different methods of accounting (e.g., tracking kilowatt-hours based on *monthly* average production versus sales or based on *hourly* matching on-line capacity versus sales) and the inclination of suppliers to buy power from different sources by the hour, depending on pricing and availability.

Bid Clean/Green Power Options as Bid Alternatives

The facilities manager should consider bidding clean/green power options as bid alternatives in order to identify the premium or additional costs of these services. Campus administrators will want to know this price differential infor-

mation when awarding contracts. Providing appropriate bid alternatives can thus facilitate the decision-making process. In any event, facilities managers will have to develop campus constituencies and arguments that support the idea of spending more money in order to do what is environmentally responsible.

Appendix

State University of New York at Buffalo Electricity Purchasing Policy*

The following principles should apply to all electric purchases for the State University of New York (SUNY) at Buffalo:

1. *Compatibility with Campus Energy Conservation Efforts.* The terms and conditions of electricity purchases should sustain or enhance SUNY Buffalo's energy conservation program—not undermine it—by avoiding damaging rate structures and, if possible, by incorporating energy efficiency services.
   a. *Rate Structure.* Electric rates should be structured to maintain appropriate financial incentives for continued energy conservation and efficiency. Declining block or marginal rate structures provide disincentives to conservation and efficiency and should be avoided. Flat rates maintain incentives. An acceptable rate structure will provide sufficient financial incentive to sustain a program of campus energy conservation improvement.
   b. *Energy Efficiency Services.* The University will attempt to negotiate electricity purchase agreements that include, as a value-added component, energy efficiency services.
2. *Buying Clean Power.* SUNY Buffalo should buy power from environmentally clean sources as defined by the emissions profile (i.e., carbon dioxide, sulfur dioxide, and nitrogen oxides per kilowatt-hour). Dirty coal power should be rejected in favor of efficiently produced, natural gas–fired electricity. The University should explore buying a percentage of its power from clean, renewable power sources when these are available.

*Approved February 1998.

Chapter 12

Procurement of Energy Services

Gary C. Matteson

You are now at the point where your understanding of the market and your energy requirements have prepared you to contract for energy services. This chapter will examine the elements of purchasing energy services. It will define how to contract for the commodity (i.e., electrical energy) and for the services (e.g., metering, billing, and energy audits). The objective is to enable facilities managers to write the Request for Qualifications, the Request for Proposal, and the contract.

Throughout the procurement process, the campus must deal with vendors in an honest and forthright manner. Whether or not the manager is required to follow a prescribed purchasing format, he or she should make known the format that will be used and follow it. Failing to follow the stated format will lead to, at a minimum, bad faith with vendors and possible lawsuits.

Preparing to Write an Energy Services Contract

A campus that is ready to start the procurement process for electrical energy services must define the elements of the contract. These elements must be derived through internal campus discussion and, if the campus has decided to explore aggregating loads with another entity, negotiations with those partners. The following list suggests an approach whereby a multidisciplined team would work through the procurement steps sequentially. A campus could also group the elements, and their respective work groups, into categories, such as finance, economics, engineering, and legal. This latter approach requires a coordinator to tie everything together when the time comes to write the actual procurement documents.

1. Complete the assessment of your operations and needs.
2. Clearly define the expected minimum savings you are willing to take from the contract (a savings amount that is above "business as usual").
3. Budget for the costs of the procurement actions (legal, economic, and engineering consultant fees).
4. Evaluate whether the university, college, or school should attempt to enter the direct access market on, or immediately after, the starting date for your state.
5. Assess the potential capabilities of the vendors that may respond to the Request for Qualifications.
6. Determine whether the institution should attempt to influence the legislative and regulatory process within the state as it proceeds through the procurement process.
7. If the university, college, or school is joining up with another institution (e.g., a school or adjacent town) to aggregate respective loads, determine whether the two institutions will

(a) jointly or independently administer the respective procurement processes;
(b) jointly or individually issue the energy services contract.

8. Determine whether the university, college, or school is aggregating the loads for all eligible campus units, or just selected campus units.
9. Define the length of the contract as one year, two years, length of the transition funding period (competition transition charge period), or long-term (e.g., 10 years).
10. Implement strategies, defined earlier in this book, to avoid paying any stranded assets charges (competition transition charges).
11. Determine whether the campus wants a specific portion of the commodity supplied from renewable energy sources (i.e., green power) and, if so, whether it is willing to pay a premium for this type of supply.
12. Determine what type of supply-side services—metering, billing, and so forth—will be included in the contract and whether some or all of these services will be included in the quoted price of the commodity.
13. Determine what type of demand-side services—energy audits, lighting retrofits, chiller change-outs, and so forth—will be included in the contract.
14. Determine the price and performance guarantees.
15. Determine whether the contract should have an option to permit the campus to halt vendor negotiations (before signing the contract) and enter into a state contract.

Case Report: Moving Forward at University of California and California State University

The desire to explore the benefits of aggregating the electrical loads and sharing the administrative costs of the procurement process was the impetus behind an alliance between the University of California and California State

University systems. In late 1996 the procurement team defined the nine tasks listed below.

1. Send out a Request for Qualifications and identify qualified bidders.
2. Conduct a bidders' conference.
3. Determine the qualified bidders.
4. Select a short list from the qualified bidders.
5. Conduct a second bidders' conference for the short list of qualified bidders.
6. Send out a Request for Proposal to the short list of qualified bidders.
7. Select the finalists based on best response for a commodity discount.
8. Negotiate with a finalist.
9. Write the energy services contract.

Defining these tasks required many strategy planning sessions, both on the respective campuses and at the frequent meetings of the campus energy managers, and consultations with both institutions' system-wide officers. The entire process culminated in an award to Enron for energy services over a four-year period. The annual savings is $2.4 million for the University of California system and $1.5 million for the California State University system. The legal and economist consulting bills were $270,000. When the cost for salaried staff from the respective institutions was added in, the total cost for procurement was $400,000.

The Bidders' Conference

As illustrated in the above case report, there should be opportunities for educating and understanding the bidders involved in the procurement process. The mechanism is

the bidders' conference. The first conference is set up about two weeks after the Request for Qualifications has been released. The second conference is set up two weeks before the Request for Proposal is sent out. The first bidders' conference (the one following the release of the Request for Qualifications) is an ideal time to correct any misconceptions, errors, or omissions in the documents.

At the second bidders' conference (the one conducted before the release of the Request for Proposal), the information exchanged can be extremely useful in assessing the general market for electrical energy services. From questions asked by the vendors, the team will be able to identify those vendors that are highly concerned about risks in the market. The team will also identify those vendors that are primarily interested in selling energy services other than the commodity. All of this information will be very important as the team moves through the latter stages of the procurement process.

For public institutions, all discussions at the bidders' conference should be considered public information. Minutes should be taken and distributed to all attendees.

What Makes Aggregating Loads Work?

The primary factors that make aggregating loads work for campuses are the following:

- The cost of the procurement process can be shared by the participating campuses.
- The combined loads can provide a better overall load factor to the energy service provider.
- Large loads increase purchasing clout.
- The collaboration includes opportunities for training the staff.

- The collaboration can be an effective influence in legislative and regulatory efforts.

The primary factors that make aggregating campus loads work for energy service providers are as follows:

- Campuses are informed, long-term customers.
- Campuses have a reliable record in paying their bills.
- Campuses tend to have a "pack mentality"; if one joins a particular vendor, then others follow.
- There are plenty of opportunities for demand-side management projects at campuses.
- There are opportunities to finance, construct, and operate heating plants at campuses.
- Aggregating campus loads is an opportunity for energy service providers to be a partner in the education of the nation.

Determining Whether Energy Service Contracts Include Infrastructure Improvements

There are five elements to be considered when energy service contracts include provisions for infrastructure improvements. The traditional elements are reliability and cost of energy. For those consumers that wish to invest in infrastructure improvements that include production and distribution systems, the three additional elements are the cost of capital, the rate of return on investment, and functionality/flexibility.

The procurement of energy-related capital equipment, buildings, and land is a relatively familiar concept for most campuses. The following economic determinations must be made before procurement:

- *Capital acquisition cost:* the cash payout at the time of purchase.

- *Rents:* the amortized cash payout over the life of the equipment, including the maintenance costs.
- *Life cycle:* the acquisition and maintenance costs over the life of the equipment.

For the four-year California "cost recovery period," campus managers will be faced with energy services providers pricing their energy using discount or cost base methodologies. For energy service providers, these will be times of fierce competition and thin margins. Under these economic conditions, the best decision for the campus manager would be to invest in distribution systems and on-site production systems (the objective is to reduce the need to pay for distribution charges and their related stranded assests charges). These distribution systems (e.g., electrical substations) might have a three-year payback with modest savings for the rest of the 40-year life of the equipment. In comparison, gas-fired cogeneration systems might have 10-year payback periods, but with much higher savings over the 20-year life of the equipment.

Many large consumers of gas and electrical power are currently realizing the economic advantages of investing in electrical generation systems and transformation/distribution/switching systems. By making these investments and operating these facilities, a consumer can obtain electrical power at substantially lower costs. Generally, a campus must have an electrical peak demand of more that 1000 kW and a delivery requirement in excess of 50 kV to consider these options.

A term often heard in the infrastructure acquisition area is *voltage buy-up*. A voltage buy-up occurs when a campus buys the infrastructure that permits it to acquire electrical energy at higher voltages. Buying power at higher voltages usually translates into lower costs per kilowatt-hour. The distribution equipment usually purchased in a voltage buy-up is the electrical substation that serves the campus.

(The same concept applies in gas when the campus purchases the infrastructure serviced by high-pressure lines.)

Should the Electrical Services Contract Include Extended Services?

Energy service companies frequently offer package deals to campuses that include both the commodity and supply-side services (e.g., billing and metering), as well as energy management projects such as energy audits and lighting retrofits. The legal ramifications of including acquisition of the commodity with extended services up to construction will be discussed in the section, "Negotiating with Vendors." The energy services provider may be in an ideal position to conduct energy audits, define a campus energy master plan, and embark on strategies to reduce energy consumption and improve the efficiency of the plant.

Writing the Request for Qualifications

Once the elements of procurement have been defined, it is time to search the market for qualified vendors. The instrument for accomplishing this task is the Request for Qualifications, which enables the manager to assess vendors' capability and financial qualifications to enter into an electrical services contract for the campus and its ancillary sites. The vendor should be a scheduling coordinator that is licensed by the cognizant independent system operator to procure electrical generation and schedule that generation into the statewide grid.

Next, the vendor must have the ability to offer noncommodity services such as metering and billing. The

vendors must prove their experience in the field of power marketing and demonstrate that they have a team of quality individuals. The ability to offer various pricing methodologies is also a factor. In addition, vendors must demonstrate that they have an understanding and the tools available to manage the risks in the complex electrical energy procurement market. Finally, vendors must demonstrate that they are financially a "going concern" in the state. (By using a vendor located in the state, managers can be assured that the vendor will be operating under local laws and regulations.)

Once the Request for Qualifications has been released, vendors must have adequate time to respond; managers may want to consider holding a bidders' question-and-answer session. The Request for Qualifications period should be at least a month, with the bidders' session scheduled about halfway through the period.

The responses received from the Request for Qualifications process must then be evaluated. A broad range of criteria is required to decide on a short list of qualified vendors. Note that although pricing methodology is part of the Request for Qualifications, pricing estimates are not requested or evaluated at this time. (After a review by the system-wide officers of University of California and California State University in June 1995, five vendors were selected for the Request for Proposal phase.)

Case Report: University of California and California State University

University of California and California State University defined six weighted criteria to evaluate responding vendors:

Criteria	Emphasis
Personnel and experience	20%
Power supply, procurement, and management	20%
Pricing methodology/flexibility	20%
Risk management (price and nonprice)	15%
Customer and noncommodity services	15%
Organization and management structure	10%

A copy of the UC/CSU RFQ may be obtained from the Chancellor's Office at California State University, 562-985-9157.

For sizable loads of approximately 500 megawatt-hours, the aggregated campuses could have as many as 20 qualified vendors, depending on response. The campuses then rank the responses and conduct interviews with all or a subset of the responding vendors. The final short list of vendors that move to the Request for Proposal stage can range from the entire original list of 20 qualified vendors to a smaller group, but preferably more than four.

Writing the Request for Proposal

Once the vendors are selected from the Request for Qualifications process, the writing of the Request for Proposal begins. This process includes sharing the campuses' electrical loads and other draft elements of the Request for Proposal with the selected vendors (this is the second bidders' conference, as noted earlier). The Request for Proposal is released to the selected vendors about a month after the second bidders' conference. The vendors need at least a month to respond.

The Request for Proposal states that the vendors have to present a plan for project management. This element requires vendors to specify the project team members, their qualifications, and specific job descriptions. The next element is the requirement to specify the implementation plan. This requires vendors to state their planned visits to the campus, their requirement for load data, and their metering and billing plans. Finally, vendors must define their pricing of direct access services. The pricing must be defined for energy services, and for the metering and billing components. Finally, all vendors should be required to sign a guarantee on pricing. A typical guarantee on pricing states that the rate paid by the university will never be worse than the rate the university would have paid (the so-called "business-as-usual" case) had it not entered into a service agreement with the vendor.

Using the Computer Model for Analysis of Vendor Proposals

The economic model described earlier contains the business-as-usual case for each campus within the bid package. The first step is to run some expected pricing options (e.g., power exchange minus 5 percent) through the model. This will provide the negotiating team some boundaries for minimal and optimal results. Next, the various pricing options should be run on different sized campuses. This will demonstrate whether size may affect the selection of the pricing options. Finally, the computer model can demonstrate the risks of certain pricing options. For example, the fixed-price option may give the best potential for savings, but there is a severe downside if the power exchange price falls below the negotiated fixed price.

Using the Computer Model for Audit of Vendor Performance

The contract with the vendors has set points that must be met (see price guarantees above). For example, the prices charged to campuses by the direct access provider may not exceed the price of the electrical energy as set by the power exchange. By inserting the actual billings into the economic model, one can readily test this criterion. Adjustments on any accounts that exceeded the contract criteria would be settled annually.

Negotiating with Vendors

The selection of the vendor submitting the best price in response to the Request for Proposal leads to negotiations. These negotiations are where the "rubber meets the road." The campus negotiating team has clearly established objectives and a qualified and willing vendor. The negotiating period is the time to work out the tradeoffs for a win–win outcome. The team must take the following five steps in preparing for negotiations:

1. List the reasons why the university wants the deal.
2. Define the maximum and minimum price that will be accepted.
3. Define why the vendor should grant this price to the campus.
4. Define the vendor's possible objections to granting the price the university wants.
5. Define the university's response to the objections cited by the vendor in item 4.

At this point the team must consider all the data supplied by the vendor in the Request for Qualifications/ Request for Proposal process, the observations made at the bidders' conference, and the information obtained through the press and other sources. The team also must review its needs and objectives. The team should consider the negotiation process to be a continuation of its efforts to educate the bidder. This means that there should be plenty of opportunity in the negotiation talks for clarification and refining of both the university's needs and the vendor's needs. Problems and apparent impasses will arise and will require a combination of working within the established parameters and the occasional application of a creative "fix."

It is critical that the negotiating team understands why the vendor wants to consummate the deal (item 3 above). What are the vendor's motives? Does the vendor want to obtain market share for its sales of the commodity? The vendor may want a larger and more diverse group of customers to achieve a more economic scale of operations. Does the vendor want to use the sale of the commodity as entry for selling other services? The extended services, which have sizable profit margins, are often the main reason for a vendor to want the deal. In some cases the vendor is actually using the commodity as a loss leader to bring the campuses into a positive relationship for the sale of energy services.

Thus, metering, billing, and demand-side services such as lighting retrofits and chiller change-outs are sales at issue for the vendor. Campuses in the public sector must understand this fact and also the fact that they may be restricted from including these services with the purchase of the commodity. The legal term for combining the purchase of commodities with the purchase of services is called *tying*. This term describes a potential anticompetitive be-

havior in which vendors that do not have commodities for sale and are in the business of selling energy management equipment or constructing facilities are screened out of the bidding process. The contract that is negotiated will define the limits of sole sourcing for extended services. Currently there seems to be sufficient precedent for purchasing metering and billing services from the energy supplier. Acquisition of these services has been routine in past dealings with the investor-owned utility. However, acquisitions that include construction of thermal energy storage systems or purchase of a substation (voltage buy-up) are areas of greater concern. (Although a private university may have more latitude in the above area, good business practice may dictate that competitive bidding be regularly used for the purchase of energy services.)

The negotiating effort may also identify surprising new value-added items. For example, a recent contract included, at no cost to the university, (1) all account setup and ongoing metering and billing services as part of the commodity price, (2) development of campus strategic energy plans, (3) sponsorship of an annual energy awards program for successful energy management programs at the campuses, and (4) sponsorship of an annual scholarship program for students pursuing an education in the energy field.

The terms and conditions usually contain statements regarding liability and *force majeure* (i.e., an "act of God"). These statements balance the benefits of the deal against the inherent risks. The university must take a risk aversion position in acquiring energy services, because outages have a high cost impact, in terms of both loss of productivity and long-term damage to valuable research components. A recent six-hour outage on a weekday, during a semester break, cost $850,000 at a major university, largely because about 10,000 employees were unable to work.

The underlying assumptions of risk must be dealt with throughout the purchasing action. The procurement of energy services has inherent risks that range from a vendor's failure to provide electrical energy when required to a university's failure to provide access to required meter information. It is also difficult to define when a failure is an "act of God"—and thereby subject to the provisions of *force majeure*—and when it simply represents negligence by an employee. Finally, there is the risk that the regulatory provision for the utility's pay off of stranded assets could impact your contract (see the discussion of stranded assets in Chapter 2). The contract should clearly define who gets any unexpected savings if there is early pay off of stranded assets by the utilities. The university must carefully assess what risks it is willing to absorb, what risks it must share with the vendor, and what risks it must insist that the vendor bear.

Signing the Contract

The signing of the contract should be viewed as a special event. Considering the amount of effort expended to accomplish these contracts, it is certainly worth making the signing an event. This provides an opportunity for the university and the vendor to make public statements on why they entered into this arrangement. It is important that the facilities manager alert the university public relations office in the event that it receives calls from the press.

At this point the procurement process is complete, but there is another phase. The implementation of the contract is just as critical as the writing of the contract. It is a good idea to rename and recharge the negotiation team as the implementation team. The members of the negotiation team

are in an excellent position to oversee the implementation, as they have established good working relationships with the vendor's team; maintaining this close coordination will ensure the project's success. The implementation phase will take at least an additional six months.

In the Final Analysis

Much has been written about partnering. Partnering is the establishment of a contract that, for many universities, represents the university's second highest cost after payroll and benefits. Both parties are obligated to abide by this contract for the duration of the agreement. In addition, this contract sets up opportunities for even greater benefits in terms of energy savings to the university and more business for the vendor if performance goes as expected.

Appendices

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Appendix A

What APPA Can Do for You

Donald T. Little

APPA: The Association of Higher Education Facilities Officers engages in a range of activities—including networking, integrating, validating, educating, publishing, disseminating, and encouraging—within the framework of important trends and changes in the facilities world. APPA's efforts are intended to equip facilities professionals to lead and act.

The restructuring of the electrical utility industry in the United States is creating major opportunities. This book explores the restructuring and its likely outcomes; even more importantly, it examines potential conditions that will allow many schools and universities to redirect utility dollars to undertake much-needed utility systems upgrades and other deferred maintenance.

How can APPA help? More importantly, how can a facilities manager's leadership champion and guide his or her institution to a higher state of operational reliability while

protecting the institution's large investment in the facility asset portfolio?

APPA provides several resources that managers and other professionals can use to prepare themselves in this rapidly changing environment.

For those interested in understanding the fundamentals, the APPA Institute for Facilities Management, offered twice a year, includes core instruction in energy and utility systems. Managers may also wish to reference the material in Part III, Energy and Utilities Systems, of *Facilities Management: A Manual for Plant Administration,* published by APPA. With this subject grounding, you might also consider checking the books and publications listed in the bibliography of this publication.

Try the Internet. Log onto APPA's website, **www.appa.org**, for online information concerning meetings, educational opportunities, publications, members, and so forth. In addition, the Association of Energy Engineers can be found at **www.aeecenter.org**. Another site with deep resources and scores of useful links is the U.S. Department of Energy at **www.eren.doe.gov**. Facilities professionals may find that the section called Federal Energy Management Program relates well to the challenges at hand.

Networking, conversing, questioning, and thinking may be the most productive activities for facilities professionals. Our collective experience and knowledge is great indeed, and we keep growing and acquiring more. Call your peers, especially those in states that have implemented electrical utility restructuring. Utilize the vast resources and experience of APPA's Subscribing (corporate) members. Many of them are vigorously engaged in the reconfiguring that is described in this book. The dynamism currently manifested in the broad domain of energy and utilities by the commodity providers, the design community, and the various

service providers is quite remarkable. Facilities professionals owe it to themselves and their teams to engage APPA's Subscribing members and other professionals. They will help you explore your many options and are eager to help.

Finally, the January/February 1997 issue of *Facilities Manager* features articles on topics pertaining to utilities and the theme of Plugging Into Energy Deregulation. "The Opportunity Assessment Workshop: Answers to Financing of Deferred Maintenance," by Leslie A. Solmes, is particularly relevant. The key idea here, and one that APPA and the U.S. Department of Energy both encourage, is to find ways to combine both the electrical utility savings driven through new purchasing practices and the demand-side savings, and then reallocate and reinvest these scarce operating dollars into the long-term viability of the utilities infrastructure.

Appendix B

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http://www.ceert.org/index.html

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http://www.green-e.org

Electric Light and Power Magazine
(PennWell Publishing Co.)
http://www.pennwell.com

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http://www.epri.com

Energy User News (publication)
http://www.energyusernews.com

Global Energy Marketplace (energy efficiency and renewal)
http://gem.crest.org

National Association of Regulatory Utility Commissioners
http://www.naruc.org

National Resources Defense Council (choosing power in California's deregulated electric market)
http://www.nrdc.org/howto/encagp.html

Pacific Northwest National Laboratory
http://www.pnl.gov:2080 (library resources)

PECO
http://www.peco.com

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http://powervalue.com

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http://www.pur.com

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U.S. Department of Defense/Federal Energy Management Program
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http://www.eia.doc.gov/cneaf/electricity/chg_str/tab-5rev.html

U.S. Department of Energy, Office of Budget, Planning, and Customer Service
http://www.doe.gov (visit news and hot topics)

U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy
http://www.eren.doe.gov (check various technologies including motor master software)

U.S. Environmental Protection Agency (EPA)
Green Lights & Energy Star Buildings Programs Homepage
http://www.epa.gov
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Central & South West Corp.
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Houston Lighting & Power Company
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General Public Utilities Corp.
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Illinois Power Company
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New York Power Authority
http://www.nypa.com

Northern States Power Company
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Potomac Electric Power Company
http://www.pepco.com

Public Service Electric & Gas Company
http://www.pseg.com

Tennessee Valley Authority
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TU Electric
http://www.tu.com

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Walter Simpson is energy officer for the State University of New York at Buffalo, a position he has held since 1982. Under his leadership, the energy conservation program of SUNY Buffalo has achieved national recognition. Current estimated savings from energy conservation are $9 million annually, with cumulative savings in excess of $60 million over the 20-year life of the program. He is a certified energy manager and a certified lighting efficiency professional. He served as university project manager for the $17 million CES/Way demand-side management project that won 1997 "Energy Project of the Year" from the Association of Energy Engineers. In addition to his energy manager responsibili-

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